ThinPrint®

ThinPrint Engine on print servers

ThinPrint version 10.6

Manual

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Safety warning

All ThinPrint products are pure software solutions. Please note the safety warnings in the technical documentation from your hardware vendor and from the manufacturer of each device and component.
Before beginning installation, we recommend closing all windows and applications and deactivating any virus scanner.

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Introduction

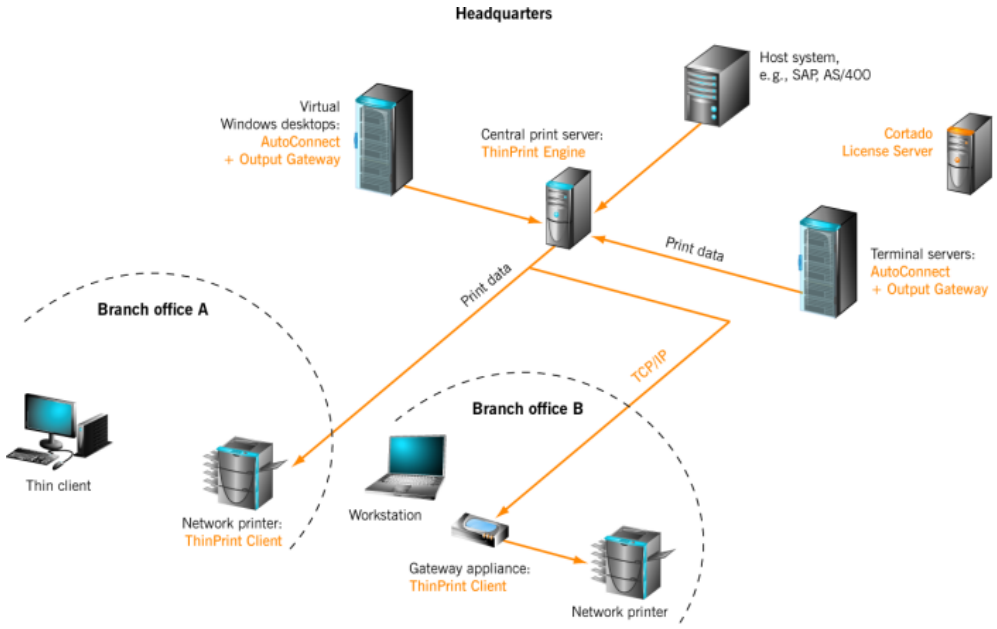
What is ThinPrint?

The ThinPrint product line offers premium print management for all IT environments. This includes server-based, virtualized or distributed PC architectures, using homogeneous or heterogeneous hardware and operating features, with or without an integrated print server. Mobile workers, home offices, as well as complete branch offices can be easily integrated into the existing corporate IT infrastructure, with no restrictions on printing flexibility, performance or convenience.

ThinPrint meets all the requirements of professional print management, thanks to high levels of print data compression, secure SSL-encryption, connection-oriented bandwidth control and dynamic printer deployment, as well as technology solutions such as Driver Free Printing, ThinShare and V-Layer.

The technology

ThinPrint consists of a server as well as a client component – i.e. **ThinPrint Engine** and the **ThinPrint Client** (Illus. 1).



Illus. 1 Using ThinPrint with server and client components

Note! If all properties of native printer drivers (e.g. finishing options) shall be accessible in Output Gateway's user interface we recommend **V-Layer** as print mode. Otherwise with pure **Driver Free Printing** the use of Management Center is necessary to transmit the printer properties from the ThinPrint Clients to the printer objects on the central print server.

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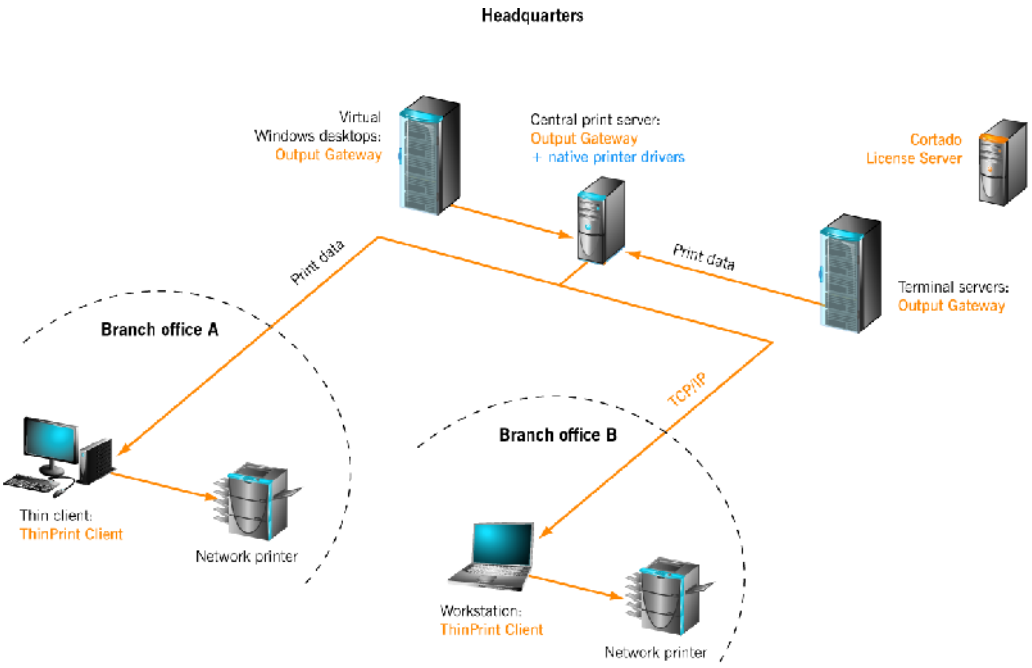
Server components

The server component **ThinPrint Engine** is the core of the ThinPrint framework. It provides complete printer driver management including Driver Free Printing.
ThinPrint Engine performs the following main functions:

- Bandwidth controlled transmission of print jobs
- Print data compression and streaming
- Print data SSL/TLS encryption
- Provision of the (virtual) printer driver **TP Output Gateway** (enables a radical reduction of printer drivers on printing computers = Driver Free Printing).
- In sessions on terminal servers (or remote desktop session hosts), virtual desktops or workstation printers are mapped by **AutoConnect**, a component of ThinPrint Engine.

Driver Free Printing, V-Layer and Native Printing

Thanks to Driver Free Printing, time-consuming server-side installation and administration of printer drivers under Windows is no longer necessary. Printer driver conflicts are also a thing of the past. The native printer drivers are only installed on Windows machines (usually print servers). On terminal servers, virtual desktops or workstations, only ThinPrint's universal driver **TP Output Gateway** is installed. That means that any type of printer can be used on any printer port; e.g., multifunction devices (printer, fax, copier, and scanner all-in-one) on a USB interface or a laser printer on a bidirectional interface. Just as with V-Layer, the native printer drivers are not installed on the client side, but rather on the central print server (Illus. 2).



Illus. 2 V-Layer: native drivers are installed exclusively on the central print server

Irrespective of that, ThinPrint can also send its print data conventionally – without the use of Output Gateway – using the native printer driver: so-called **Native Printing**.

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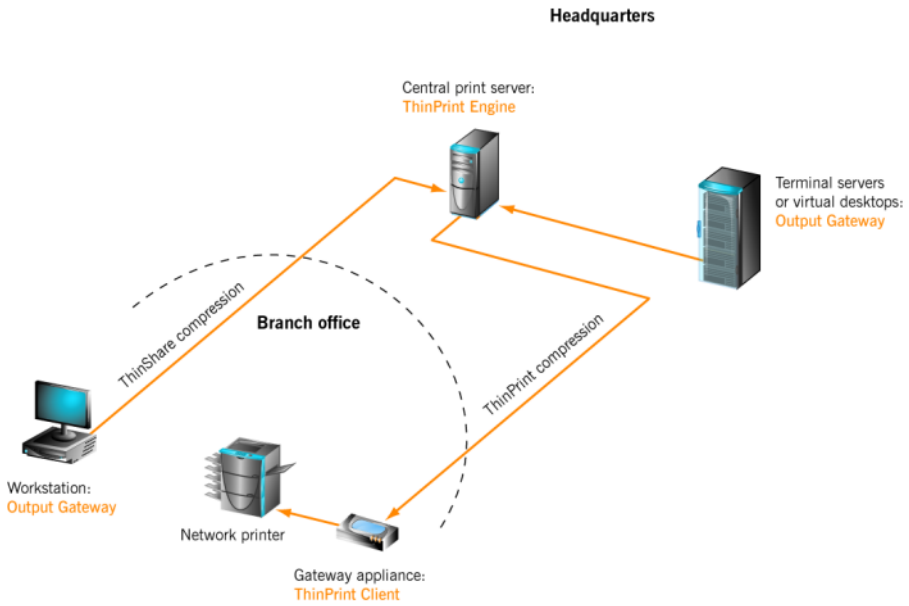
Print data compression

The compression of ThinPrint print data can be influenced as follows:

- In **Driver Free Printing** mode, one option is *Advanced Adaptive Compression* level of the Output Gateway driver (see THINPRINT COMPRESSION in Illus. 3 as well as Illus. 24 on Page 29). This method analyzes the individual components of a print job and compresses each with the corresponding best algorithm before transmitting the data. Additionally, user errors that can occur when inserting images into a document are corrected. This reduces data volume by up to 98%. These compression levels can also be used with *Cloud printing* (Page 89). Alternatively, you can also influence the compression in the ThinPrint Port configuration (Page 26).
- In **V-Layer** and **Native Printing** modes, the compression can only be influenced in the ThinPrint Port configuration (see THINPRINT COMPRESSION in Illus. 3 as well as the section *Configure tab* on Page 26).
- In the case of printer shares connected to computers in branch offices, it's additionally possible to compress the print data in the opposite direction – between the computers in the branch office – where the applications run – and the central print server. This compression of the share's print data is called *ThinShare*; it's available with **Driver Free Printing** and **V-Layer** print modes (see THINSHARE COMPRESSION in Illus. 3 as well as the section *Workstations and virtual desktops* on Page 21). ThinShare can also be used with *Cloud printing* (Page 89).



Illus. 3 Print data compression

Client component

On the client side, **ThinPrint Client** is generally responsible for receiving print data, decompressing it, and sending it to the print device. There are many ThinPrint Clients available for different end devices and types of use: for all Windows, for Mac OS and Linux as well as for both internal and external print servers of network printers. Please note that there are different ThinPrint Client types for the protocols **RDP**, **ICA** and **TCP/IP** – the latter as both an application and a Windows service. Furthermore, the **PCoIP** type is embedded in the VMware Horizon View Client.

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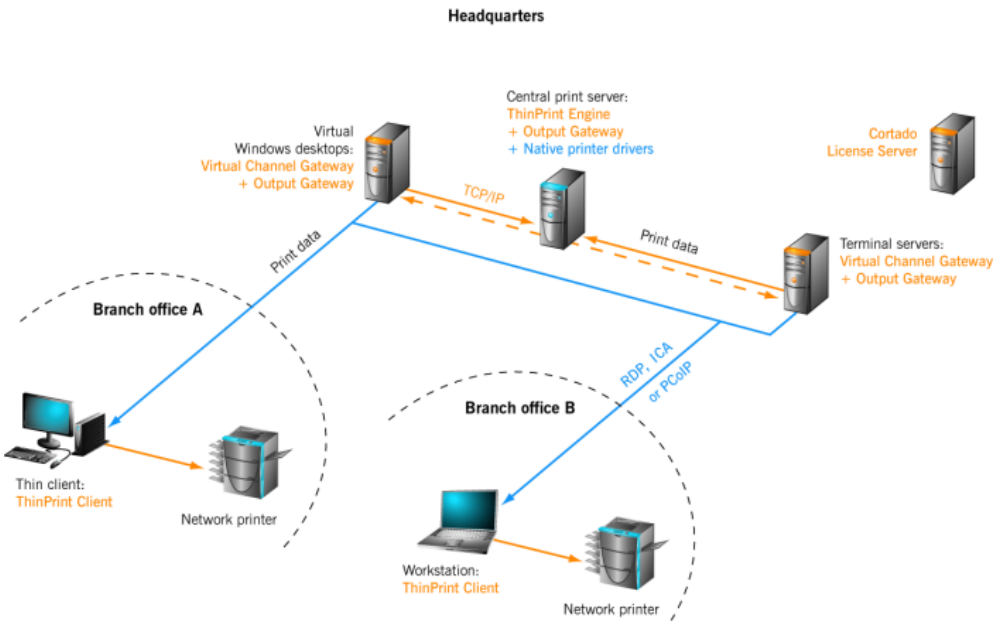
ThinPrint Clients are not necessary on workstations or thin clients, if neither printer mapping with Dynamic Printer Matrix nor compression or encryption is required and if the print jobs are to be rendered on the central print server (e.g. using V-Layer). In this case all printer drivers will be installed on the central print server, and the print jobs are sent directly to network printers, gateway appliances or local print servers.

The ThinPrint Clients can be downloaded from the ThinPrint website. The website also includes information on devices which are already embedded with ThinPrint Clients. If you require a ThinPrint Client which is not listed on the website, please send an e-mail to info@thinprint.com.

Print routes

The ThinPrint Engine can send print jobs via the following routes:

1. **Via TCP/IP directly to network printers**, gateway appliances or local print servers (Illus. 1). Here, ThinPrint Client (TCP/IP type) is required only if the target device needs to be able to decompress or decrypt print data or to render the print jobs using the native printer driver.
2. **Via TCP/IP directly to workstations** or thin clients (Illus. 2). Here, the TCP/IP type of ThinPrint Client is required on the workstations and thin clients.
3. **Via RDP, ICA or PCoIP to workstations** or thin clients using the Virtual Channel Gateway (Illus. 4). Here, the RDP or ICA type of ThinPrint Client is required on the workstations and thin clients – for PCoIP a VMware Horizon View Client with embedded ThinPrint Client is necessary.
4. **Via LPR/LPD directly to network printers** (Illus. 35). Print data can be sent bandwidth controlled, but not compressed. ThinPrint Clients are not necessary.



Illus. 4 Print jobs are sent (back) from the central print server via TCP/IP to the Virtual Channel Gateway on terminal servers or virtual desktops and then via RDP, ICA or PCoIP to workstations or thin clients

Irrespective of the chosen print route: You can use **Driver Free Printing** if the target device is a Windows machine. Otherwise select **V-Layer** (always recommended). For

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more information see the section *Driver Free Printing, V-Layer and Native Printing* (Page 8).

Package contents

The ThinPrint Engine product ZIP contains amongst other components:

- The License Server installer
- The ThinPrint Engine installer
- The installer for both License Server and ThinPrint Engine
- A quick installation guide for installation on print servers
- A quick installation guide for installation on terminal servers

Licenses

The ThinPrint Engine has **user-based licensing**. The License Server installer can install a license key. But for productive purposes you should have received license keys from your reseller; these are also installed on the **License Server** (Illus. 4). License keys of the following types are available:

TLUS-0750-10...	**annual** ThinPrint Engine **Premium** license (ALM)
TPUD-0745-10...	**perpetual** ThinPrint Engine license
TPUS-0745-10...	**perpetual** ThinPrint Engine **Premium** license

The third block of the key indicates the number of licensed named users (here: 10). More information about ThinPrint licensing can be found in *License key overview* in the *Licensing* manual as well as in the *License Server* manual.

Premium licenses

Premium licenses contain the following additional components or products:

- Mobile Print
- Print job tracking
- Host Integration Service
- Connection Service
- Management Center
- Support of Microsoft Failover Clusters (Windows Server 2008 R2 only)

Note! If License Server and either of the components Host Integration Service, Connection Service or Management Center are installed on different machines, then the license keys of **ThinPrint Engine Premium (TLUS or TPUS)** must be installed **on the License Server**, but those of the other components on the respective computers:

TPHS on the **Host Integration Service** machine
THCG on the **Connection Service** machine
TPMC on the **Management Center** machine

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Print server scenarios

The following example scenarios illustrate typical environments in which ThinPrint can be deployed. The depicted scenarios can also be combined – flexibility in mixed environments is one of the strengths of ThinPrint.

See also the scenarios in the section *Praxis: Creating and connecting printers* (Page 95).

Terminal servers, host systems and virtual desktops – Printing via TCP/IP

The main purposes of centralized, dedicated print servers are to centralize print administration and to remove workload from other servers and/or host systems. ThinPrint Engine makes it possible to compress print data received by terminal servers, hosts or virtual desktops, to encode it and, within bandwidth limits, send it to client computers or to network printers (Illus. 1). If Windows hosts or virtual Windows desktops are being employed, it is also possible to use Driver Free Printing and V-Layer.

Each user can use all printers in the network which are accessible via TCP/IP – regardless of whether she/he is using a workstation, a thin client, or any other type of client. Further information can be found in *Setting up ThinPrint Ports and printers* (Page 23).

If necessary, addressing ThinPrint Clients in masked networks via TCP/IP is made possible with the **Connection Service**. It is also the ideal gateway component for the DMZ. Further information can be found in the ThinPrint Connection Service manual.

Terminal servers and virtual desktops – Printing via RDP, ICA or PCoIP

Central, dedicated print servers generally print to a computer, network printer or appliance via TCP/IP (Illus. 1 and 2). If, however, TCP/IP is not possible or not wanted as print protocol, the **Virtual Channel Gateway** allows print data to be sent through the RDP, ICA or PCoIP virtual channel to the workstation or thin client (Illus. 4).

The Virtual Channel Gateway receives print jobs from the central print server, converts addressing from TCP/IP to RDP, ICA or PCoIP, and forwards the print data on to the session user. Further information can be found in *Setting up ThinPrint Ports and printers* (Page 23).

Client/Server printing – via TCP/IP

Print servers can also be used for Windows workstations, in order to centralize all native printer drivers on a print server using V-Layer, as well as to centralize the printer administration.

Each user of a Windows workstation can use all printers in the network which are accessible via TCP/IP. This way only a single printer driver is necessary on the workstations – the **TP Output Gateway** (Illus. 5).

A ThinPrint Client (TCP/IP type) is required only if the target device needs to be able to decompress or decrypt print data or to render the print jobs using the native printer driver.

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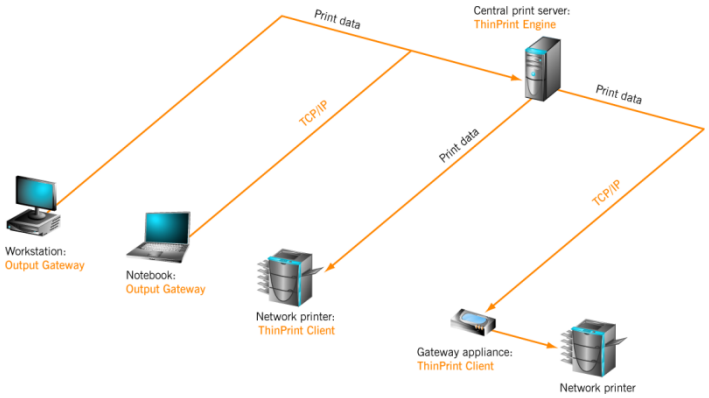

Illus. 5 Client/Server printing with ThinPrint Engine on a central print server: Windows workstations need a single printer driver only

Installation

Technical requirements

Be sure that the **TCP ports** for printing via TCP/IP are not being blocked by another program or by a server-side or client-side firewall. Default ports are:

- License Server inbound: 4004 and 4005
- ThinPrint Engine outbound: 4000 for printing, 4005 to the License Server and – if needed – 443 to the cloud
- Connection Service inbound: 4000 and 4001
- ThinPrint Client inbound: 4000 for print jobs from the ThinPrint Engine
- ThinPrint Client outbound: 4001 to the Connection Service

IPv4 has to be enabled for each involved machine (IPv6 should be disabled).

ThinPrint Engine

ThinPrint requires the following:

Supported server operating systems

- Windows Server 2003 + 2003 R2 with Service Pack 2 or later
- Windows Server 2003 + 2003 R2 x64 with Service Pack 2 or later
- Windows Server 2008
- Windows Server 2008 x64
- Windows Server 2008 R2 including failover clusters
- Windows Server 2008 R2 Core
- Windows Server 2012
- Windows Server 2012 Core
- Windows Server 2012 R2
- Windows Server 2012 R2 Core

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Also required:

- **.NET Framework** version **3.5**
  For Windows 2012, please also install .NET Framework 3.5.
- With Windows Server 2008 SP1: Microsoft Hotfixes KB958741 (Print Job Owner) and KB958656 (Client Side Rendering)
- With all terminal servers (with Windows Server 2008 R2) and desktops (with Windows 7) which use the central print server(s): Microsoft hotfix KB2493115
- Server role *Print and Document Services* is enabled
- If necessary: Microsoft SQL Server 2005 Express or later for the Tracking and the Management Center databases

ThinPrint Engine can be installed together with the following ThinPrint components on the same server (provided it's supported by the respective operating system):

- License Server
- Mobile Print
- Management Center[1]
- Management Services[2]
- Connection Service
- Host Integration Service

License Server

Supported server operating systems

- Windows Server 2012 R2
- Windows Server 2012
- Windows Server 2008 R2
- Windows Server 2008

ThinPrint Client

- Workstations or local print servers: Windows 10, 8.1, 8, 7, XP, 2012 R2, 2012, 2008 R2, 2008, 2003 R2 SP2, 2003 SP2
- Apple MacIntosh, Linux, Windows 2000, NT 4, ME, 98, 95 with Windows-Installer version 2.0 and later
- Thin clients with embedded ThinPrint Client as well as ThinPrint gateway appliances

Administrator permissions

For all stages of installation and configuration, you will need a normal domain user account with local administrator permissions:

- To install and configure the software, set up a normal user account in the AD (Active Directory). **LicService** used here as an example.
- Then give this account local administrator permissions on the license server.

1 http://download.cortado.com/docu/ThinPrint/MC/en/2.2/

2 http://download.cortado.com/docu/ThinPrint/Tpms/en/1.0/

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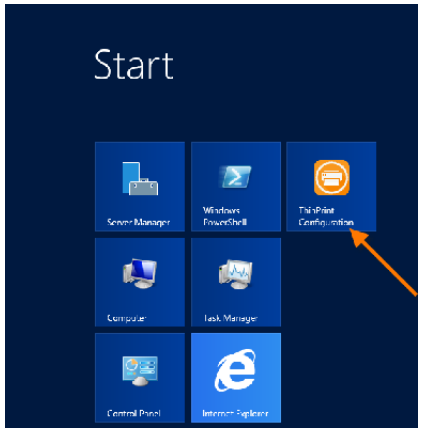
Installing ThinPrint Engine, License Server and ThinPrint Client

Follow the instructions in the *ThinPrint Engine on print servers* quick installation guide.

Global settings

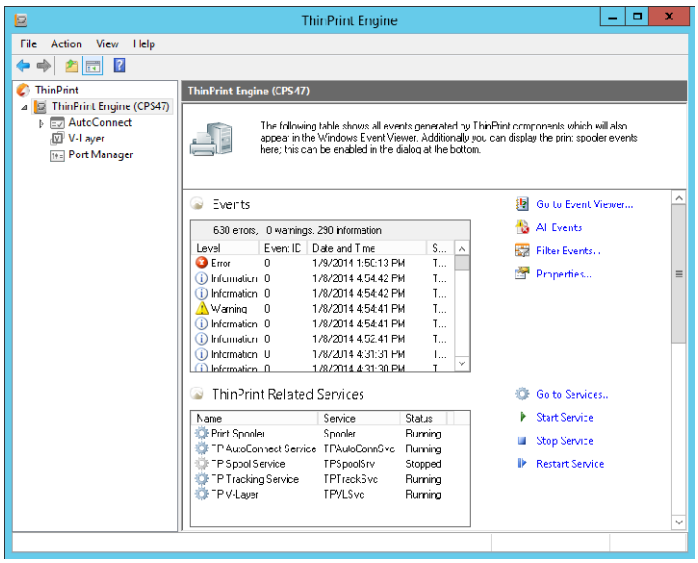
ThinPrint Configuration console

– Open the THINPRINT CONFIGURATION console (Illus. 6).



Illus. 6 Start Configuration

The ThinPrint Engine console appears (Illus. 7).



Illus. 7 ThinPrint Engine console

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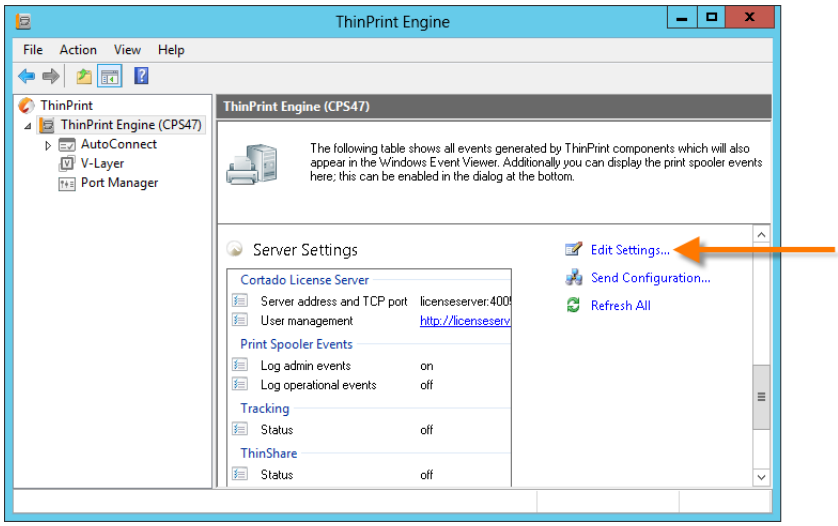
Here, you will find all events generated by ThinPrint components. Additionally you can display and filter print spooler events as well as manage the ThinPrint services and the print spooler.

Note! Saved server settings will only be effective after a spooler restart. With Windows Server 2008 R2 or later, spooler events cannot be shown here at present.

– Scroll down and select EDIT SETTINGS (Illus. 8).



Illus. 8 ThinPrint Configuration: Select EDIT SETTINGS

License Server

– In the CORTADO LICENSE SERVER tab (Illus. 9), you can:
- change the license server address (hostname, FQDN or IP address) and the TCP port
- open the license server's configuration website by clicking its link
- change the address of the configuration website by clicking EDIT

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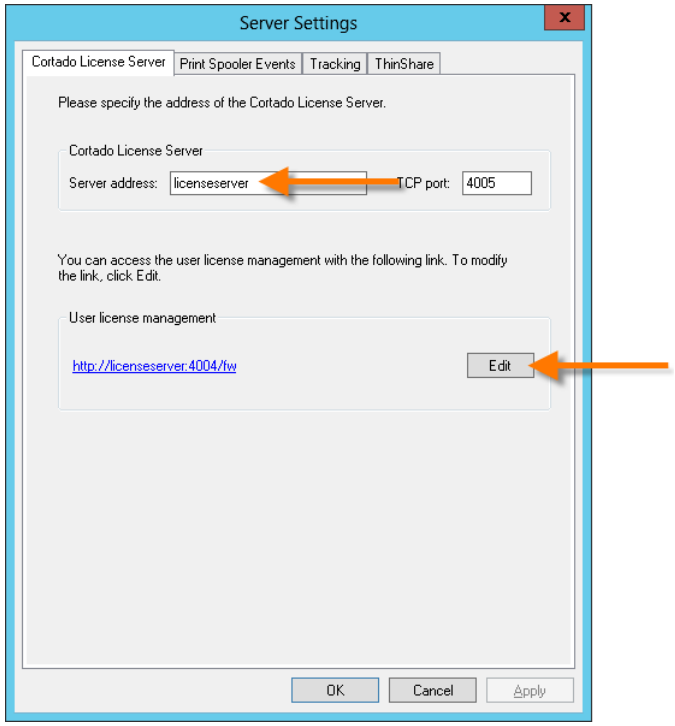
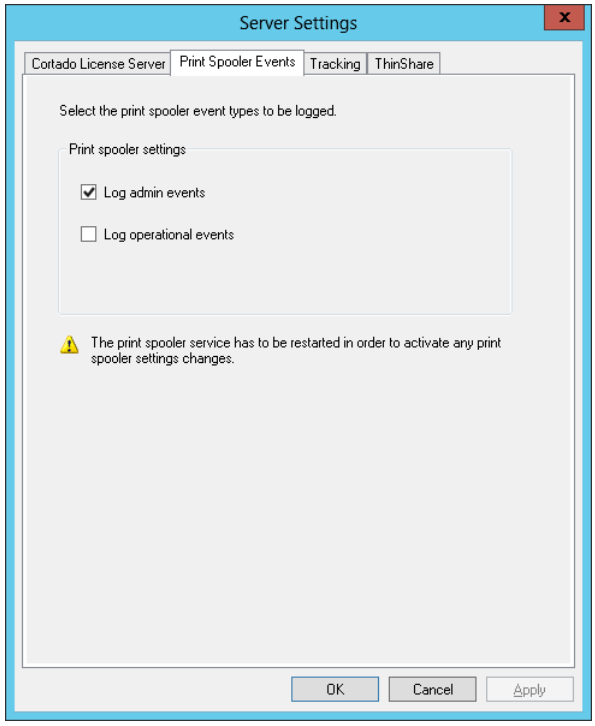


Illus. 9 License Server settings

Print spooler events

– In the PRINT SPOOLER EVENTS tab, you can select which print spooler events from the Windows event viewer are to be displayed (Illus. 10).



Illus. 10 Which print spooler events are to be displayed?

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Tracking

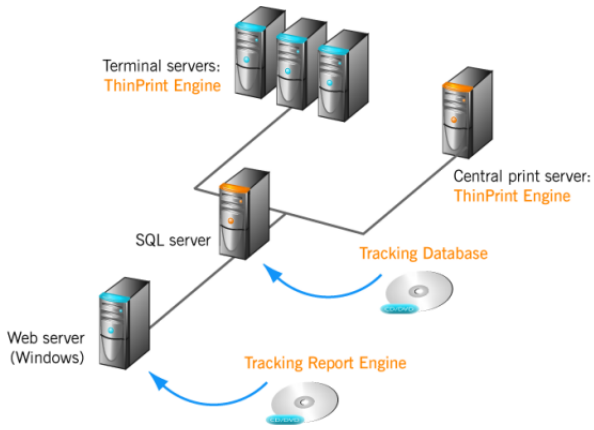
Overview of ThinPrint Tracking

The Tracking Service is included in the ThinPrint Engine installer software (ThinPrint Engine Premium license is needed). Its setup is described in the *Tracking* manual.

Print job tracking gathers information about print activities using ThinPrint Engine. With it, print related data is gathered on the server and forwarded to an SQL server (Illus. 11). Print job tracking has the following components:

- **ThinPrint Engine** (sends data to the Tracking Service)
- **Tracking Service** (receives data and writes it to an SQL database)
- **Tracking Report Engine** (web component for clear analysis, summary, and graphic report of tracking results)

Note! The SQL server is not included in the ThinPrint Engine. Tracking Report Engine and SQL server have to be set up separately (see the *Tracking* manual).



Illus. 11 Example for using Tracking

See also the section *Job Statistics tab* (Page 28).

Tracking Service

You can gather information about the print jobs sent with the ThinPrint Engine for your statistics (tracking). To do so, you must set up a Microsoft SQL server. The ThinPrint Engine sends tracking data to this server via the Tracking Service. Print data available for tracking is:

- Author of a print job
- Printer used
- Settings used
- Print job compression
- Number of pages printed
- Information on any errors

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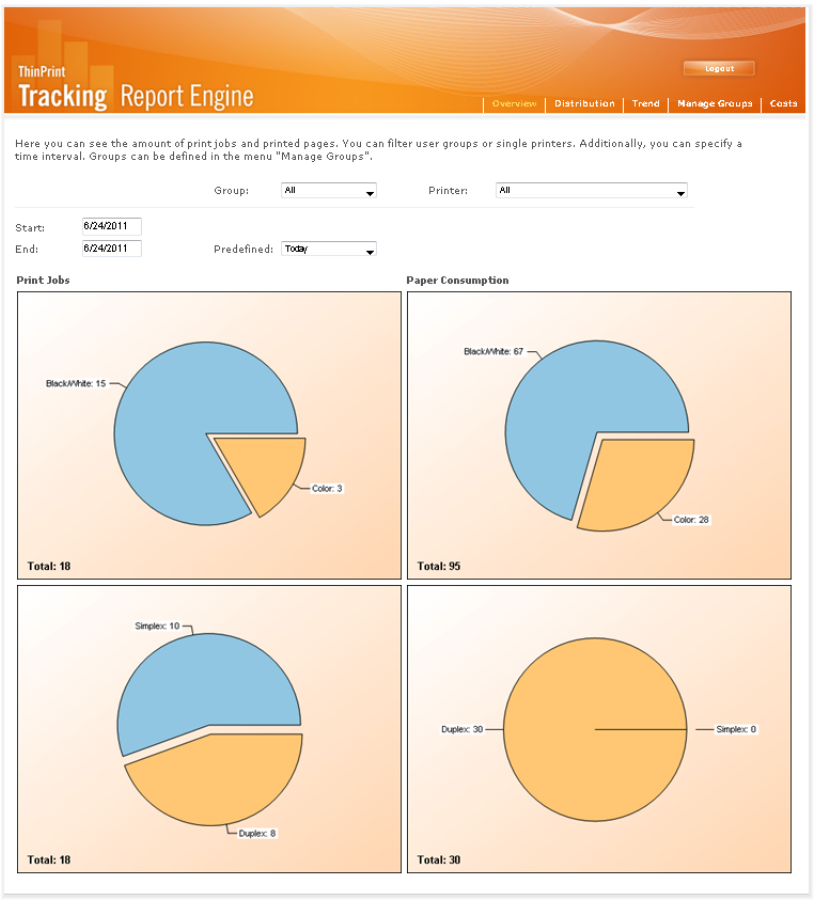
Tracking Report Engine

The Tracking Report Engine makes it possible to display data from the SQL database as an overview in a web browser. All significant information on print jobs can be summarized by various criteria, sorted, and graphically displayed (Illus. 12).



Illus. 12 Analyzing SQL data in a web browser (example)

Preparing ThinPrint Engine and Tracking Service

To prepare the ThinPrint Engine for sending data of sent print jobs to the Tracking Service, you must make the following changes to the configuration of the ThinPrint Engine:

1. Open configuration with START⟶ THINPRINT CONFIGURATION.
2. Mark the respective ThinPrint Engine node and select EDIT SETTINGS (Illus. 13).

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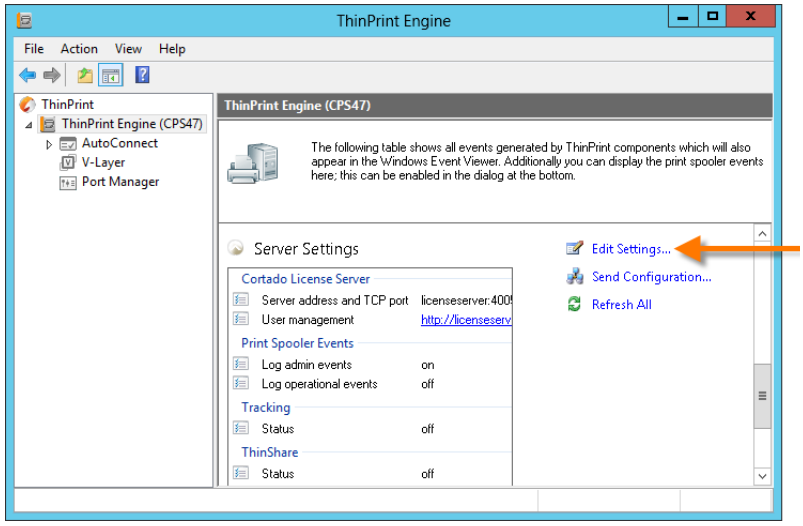
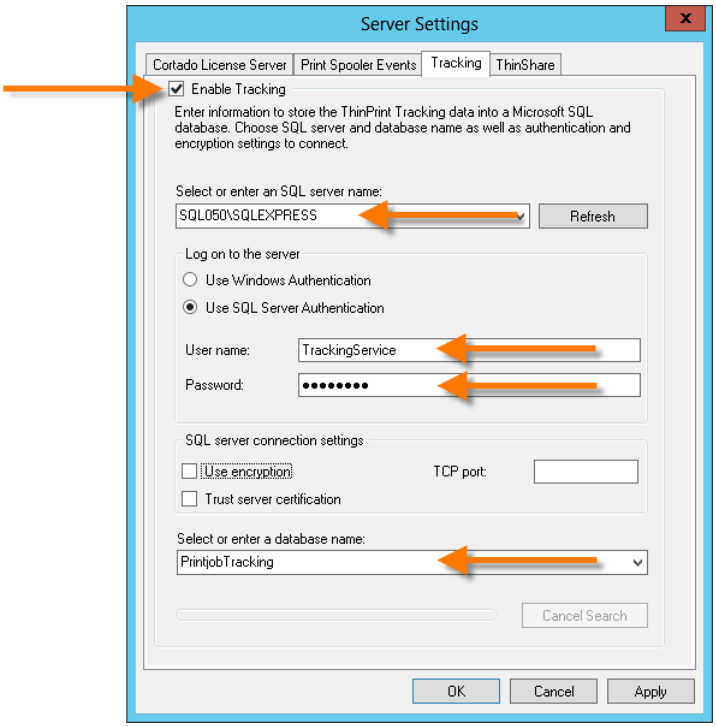


Illus. 13 Selecting TRACKING settings

3. Enter the following settings in the TRACKING tab (Illus. 14):
   - ENABLE TRACKING
   - SQL server's address and name
   - SQL server or Windows authentication: an account (specified with Tracking Database installer) which has write permissions for your database
   - Encryption settings if the data are to be sent encrypted to the SQL server
   - Name of the Tracking database (created using its installer)
4. Click OK to confirm. The result is shown in Illus. 15.

For details, see *ThinPrint Tracking* manual.



Illus. 14 Enable Tracking and enter settings

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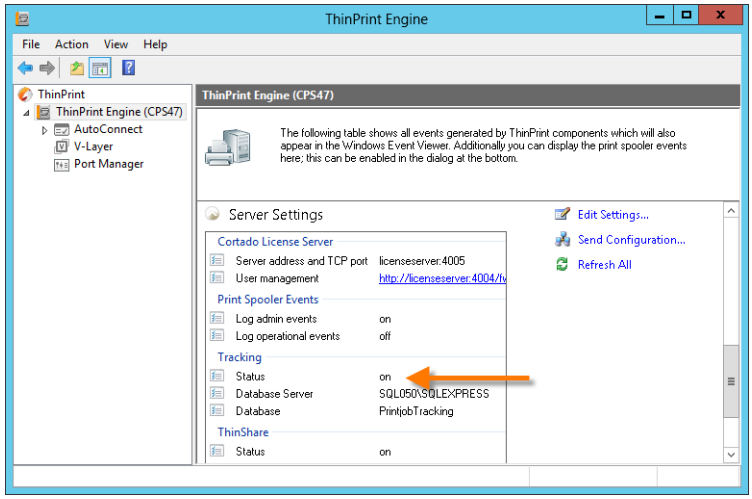

Illus. 15 Print job tracking enabled

ThinShare

Workstations and virtual desktops

– In the THINSHARE tab, you can globally:
  • enable or disable ThinShare for Output Gateway printer objects which will be created in the future (left arrow in Illus. 16)
  • enable or disable ThinShare for all (already) existing Output Gateway printer objects (right arrow in Illus. 16)
– Alternatively, you can enable or disable ThinShare:
  • for specific printer objects in the Output Gateway user interface (Illus. 40 on Page 42) or
  • for groups of printer objects using Management Center/Services templates

Enabling ThinShare sets the sharing option RENDER PRINT JOBS ON CLIENT COMPUTERS at the relevant Output Gateway printer objects (Illus. 17).[3]

3 This means – in the case of native printer drivers – that print jobs would be rendered on the terminal server instead of the print server. In contrast, with the use of TP Output Gateway this "rendering" function is used for ThinShare compression.

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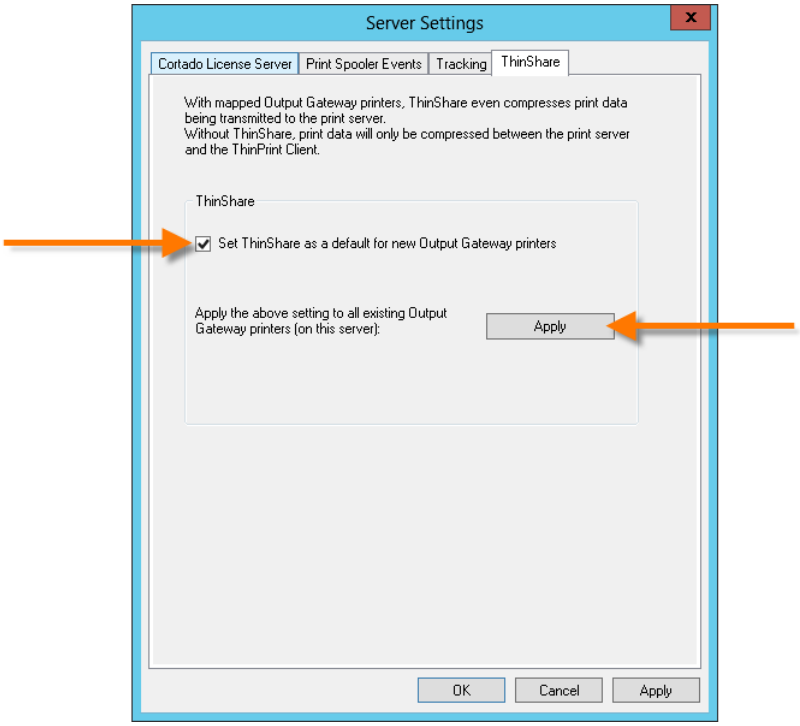
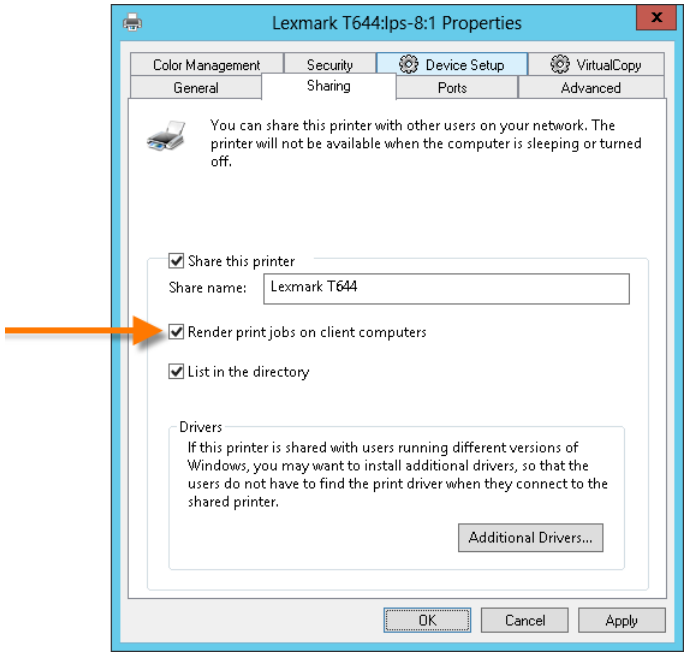

Server Settings
Cortado License Server
Print Spooler Events
Tracking
ThinShare
With mapped Output Gateway printers, ThinShare even compresses print data being transmitted to the print server.
Without ThinShare, print data will only be compressed between the print server and the ThinPrint Client.
ThinShare
Set ThinShare as a default for new Output Gateway printers
Apply the above setting to all existing Output Gateway printers (on this server):
Apply
OK
Cancel
Apply

Illus. 16 Enabling ThinShare globally


Lexmark T644:lps-8:1 Properties
Color Management
Security
Device Setup
VirtualCopy
General
Sharing
Ports
Advanced
You can share this printer with other users on your network. The printer will not be available when the computer is sleeping or turned off.
Share this printer
Share name:
Lexmark T644
Render print jobs on client computers
List in the directory
Drivers
If this printer is shared with users running different versions of Windows, you may want to install additional drivers, so that the users do not have to find the print driver when they connect to the shared printer.
Additional Drivers...
OK
Cancel
Apply

Illus. 17 ThinShare as a Windows sharing option

Terminal servers

Enabling ThinShare for terminal servers is completely different from doing so for workstations and virtual desktops, because the option RENDER PRINT JOBS ON CLIENT COMPUTERS is by default disabled on terminal servers – independent of its setting (Illus. 17). That's why the group policy ALWAYS RENDER PRINT JOBS ON THE SERVER is used here instead (Illus. 18). It can be found in the **Group Policy Management Editor** in: COMPUTER CONFIGURATION⟶ POLICIES⟶ ADMINISTRATIVE TEMPLATES⟶ PRINTERS.

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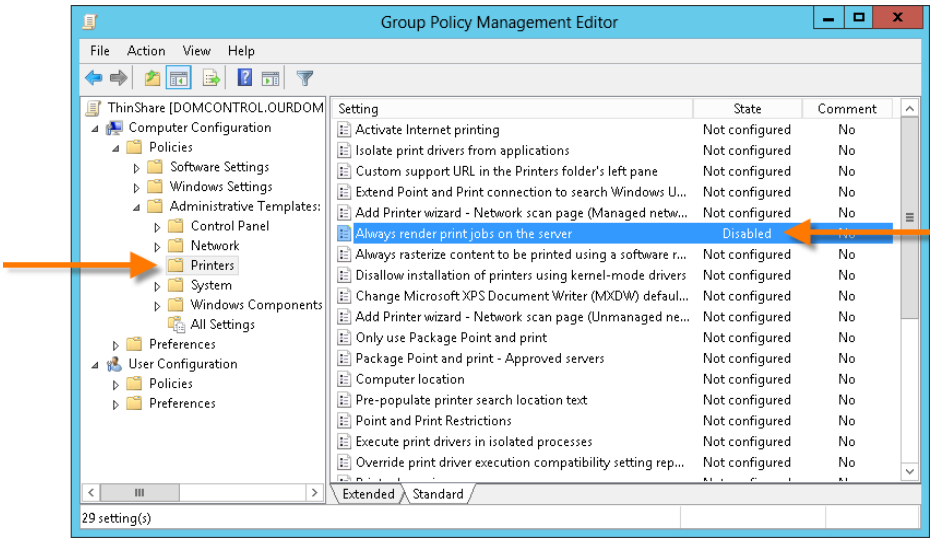
– The group policy can be set as follows:

Setting	ThinShare
DISABLED	on
ENABLED	off
NOT CONFIGURED	off

– Run `gpupdate /force` on the terminal server's command prompt to assign the group policy to the server.



Illus. 18 Group policy – ALWAYS RENDER PRINT JOBS ON THE SERVER

Setting up ThinPrint Ports and printers

This chapter describes configuration of the ThinPrint Engine with special attention to adding ThinPrint Ports and adapting them to specific requirements for print job transmission.

ThinPrint Port Manager

ThinPrint prints with its own printer ports (ThinPrint Ports) which will be automatically created during installation. Note that Cloud Printing also uses specific printer ports (Page 89). Thus, ThinPrint does not affect printing with conventional printer ports, such as Standard TCP/IP Ports.

The **Port Manager** offers the following options for ThinPrint Ports:

- Add a ThinPrint Port – local and remote
- Configure a ThinPrint Port – local and remote

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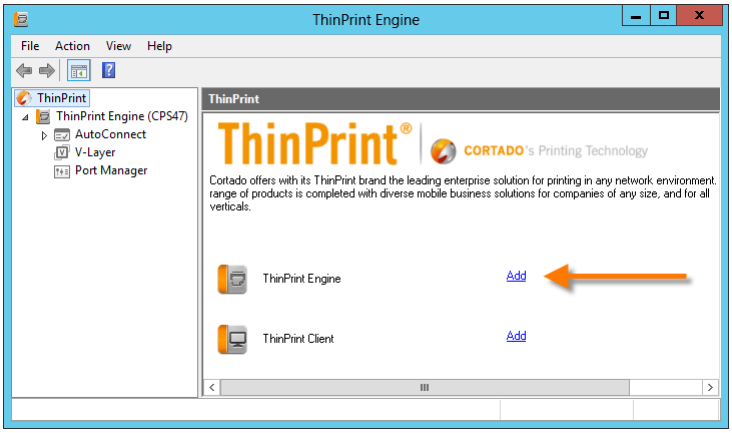
- Delete a ThinPrint Port – local and remote
- Send port configuration to other Windows machines on which a ThinPrint Engine is installed
- Export and import port properties
- Encryption settings

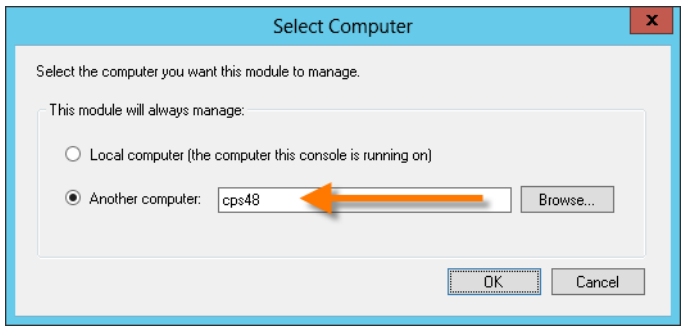
General information about ThinPrint Ports can also be found in the technical information *ThinPrint Ports*.

Starting Port Manager

1. Open the ThinPrint Configuration console (Illus. 6).
2. In case of remote configuration: In the ThinPrint node (Illus. 19), click Add and specify the computer address (Illus. 20).


ThinPrint Engine
File Action View Help
ThinPrint
ThinPrint Engine (CPS47)
AutoConnect
V-Layer
Port Manager
ThinPrint
ThinPrint
CORTADO's Printing Technology
Cortado offers with its ThinPrint brand the leading enterprise solution for printing in any network environment. range of products is completed with diverse mobile business solutions for companies of any size, and for all verticals.
ThinPrint Engine
Add
ThinPrint Client
Add

Illus. 19 Open a remote configuration for ThinPrint components



Illus. 20 Starting remote configuration or ThinPrint components

Creating new ThinPrint Ports.

To create new ports use the buttons New ThinPrint Port or New ThinPrint Connection Service Port in Port Managers menu bar (Illus. left) (Illus. 21). Choose the port settings: port type (protocol) and bandwidth and (optional) encryption.[4]

4 Recommended: 600 ThinPrint Ports with a 800 active printer queues per server (Windows Server 2003 with 3 GHz Dual Xeon processor, 2 GB RAM, and SCASII ultra3 disk array) or 1500 ports or queues with Windows Server 2008 R2

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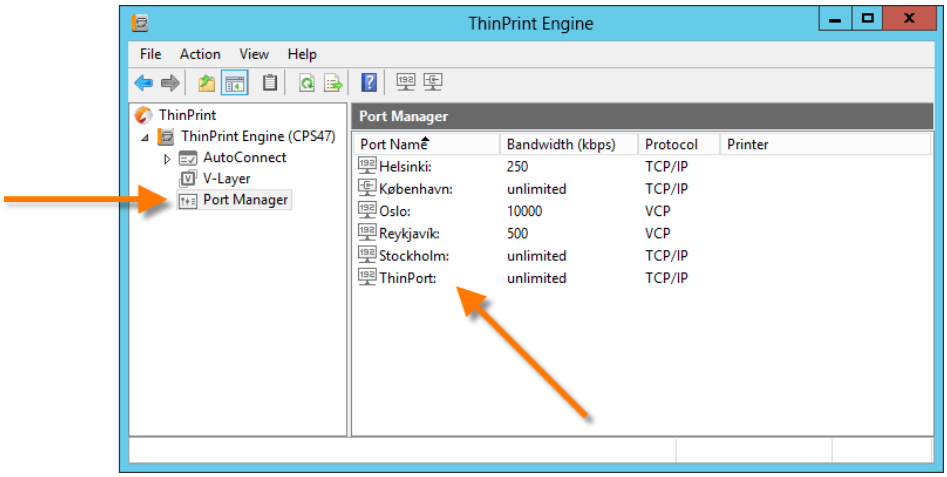
Note! In principle, there is no limit to the length of printer port names. Some old applications, however, only support port names with a length of four or six characters; if longer port names are used, this could cause problems (printer is not visible in the application, etc.).

Note! Pool not more than 20 to 25 ports because each printer of a pool must be assigned to all ports. Because of Windows restrictions the general rule is:
Length of port name x Number of ports < 200

Configuration

3. To configure ports, select from the Console Tree on the left: ThinPrint→ ThinPrint Engine→ Port Manager (Illus. 21).



Illus. 21 ThinPrint Ports in Port Manager

4. Double clicking a port name (right arrow in Illus. 21) will open the port configuration (Illus. 22).

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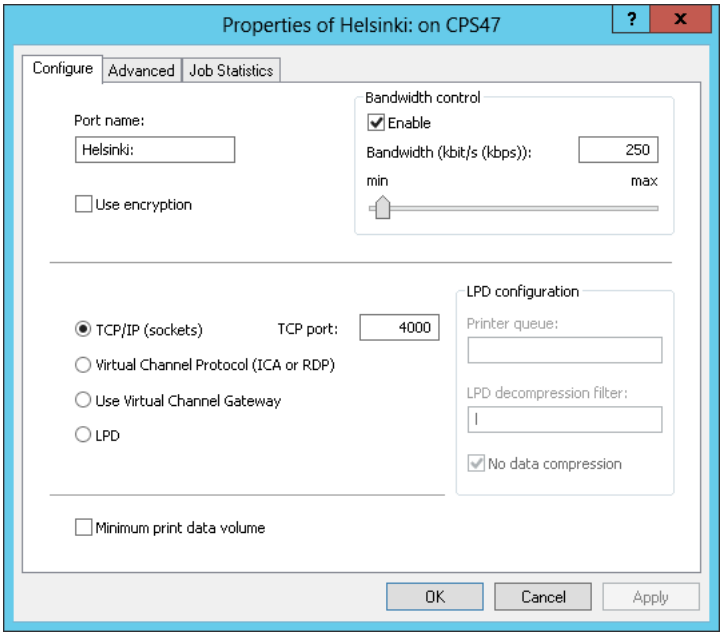
Configure tab



Illus. 22 Port settings: CONFIGURE tab

ThinPrint Ports can be configured as follows:

USE ENCRYPTION	Enables SSL/TLS encryption; a valid and corresponding certificate must be available for both ThinPrint Engine and ThinPrint Client machine (not for LPD; see also Page 55).
BANDWIDTH CONTROL	• ENABLE: Bandwidth control on • Max. bandwidth available for printing with ThinPrint; minimum: 1 kbit/s, default: unlimited
Print protocol	• TCP/IP (sockets) • USE VIRTUAL CHANNEL GATEWAY (Print data will be sent to the terminal server or virtual desktop and then sent via RDP, ICA or PCoIP with the Virtual Channel Gateway installed there) • LPD (Unix print protocol LPR/LPD) • VIRTUAL CHANNEL PROTOCOL (ICA/RDP) This function is not relevant here. It's intended for direct printing from terminal servers or virtual desktops.
MINIMUM PRINT DATA VOLUME	• Enabled: always highest compression • Disabled: transfer rate optimized compression – depends on bandwidth settings

You can also select the TCP port (default: 4000) for the TCP/IP and USE VIRTUAL CHANNEL GATEWAY print protocols (see also section *TCP port* starting on Page 88). With TCP/IP, the TCP ports of the ThinPrint Clients must be the same as those of the ThinPrint Ports. With USE VIRTUAL CHANNEL GATEWAY the TCP ports of the Virtual Channel Gateway(s) must be the same as those of the ThinPrint Ports.

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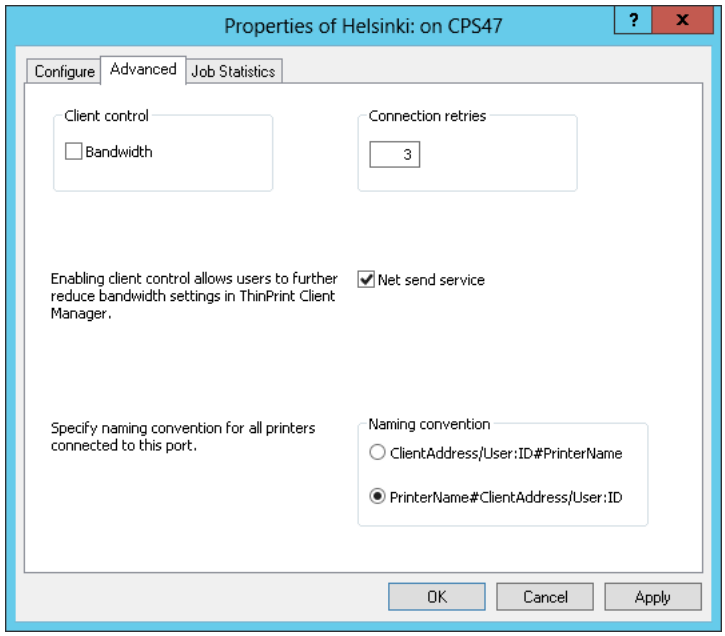
For LPD printing, see the technical description *ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD*.

Save

– Confirm changes with APPLY or OK.

Advanced tab



Illus. 23 Port settings: ADVANCED tab

Under **ADVANCED**, you have the following options:

CLIENT CONTROL: BANDWIDTH

If this option is enabled, each user can set her/his own bandwidth value (in the ThinPrint Client Manager).

Client bandwidth settings must be lower than server-side settings; otherwise, ThinPrint Port settings are applied.

CONNECTION RETRIES (TCP/IP and LPD only)

Enter the number of times ThinPrint Engine should attempt to establish a connection to the client.

NET SEND SERVICE

Net Send Service is used to notify users if ThinPrint experiences print errors. If this box is checked (= default), ThinPrint Engine will send error messages to the relevant account.

Note: This function can become irksome if several users are logged on using the same account.

NAMING CONVENTION

You can select for each ThinPrint Port whether the address information is at the beginning or the end of the printer name. Examples:

Default addressing	Reversed addressing
TCP/IP	

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Default addressing	Reversed addressing
Lexmark T620 PS3#192.168.1.100	192.168.1.100#Lexmark T620 PS3
Lexmark T620 PS3#192.168.1.100:1	192.168.1.100:1#Lexmark T620 PS3
HP LaserJet 1200 PCL#client1	client1#HP LaserJet 1200 PCL
HP LaserJet 1200 PCL#client1:2 recommended: Lexmark T620 PS3#client1:2	client1:2#HP LaserJet 1200 PCL
Use Virtual Channel Gateway (RDP/ICA/PCoIP)	
HP LaserJet 1200 PCL# Lexmark T620 PS3#:1 recommended: HP LaserJet 1200 PCL	HP LaserJet 1200 PCL :1#Lexmark T620 PS3
LPD	
HP PhotoSmart P1000#192.168.1.101	192.168.1.101#HP PhotoSmart P1000
HP PhotoSmart P1000#printer3 recommended: HP PhotoSmart P1000#printer3	printer3#HP PhotoSmart P1000

Job Statistics tab

Print statistics can be activated per port.

– Select the relevant ThinPrint Port; click PROPERTIES⟶ JOB STATISTICS and then **High** (every second), **Normal** (every 10 seconds), **Low** (every 30 seconds), **No update**, or **Statistics off** (default) under UPDATE SPEED as in Illus. 24.

Note! Use this function only part-time, as it may affect print performance. See also *Tracking* (Page 18).

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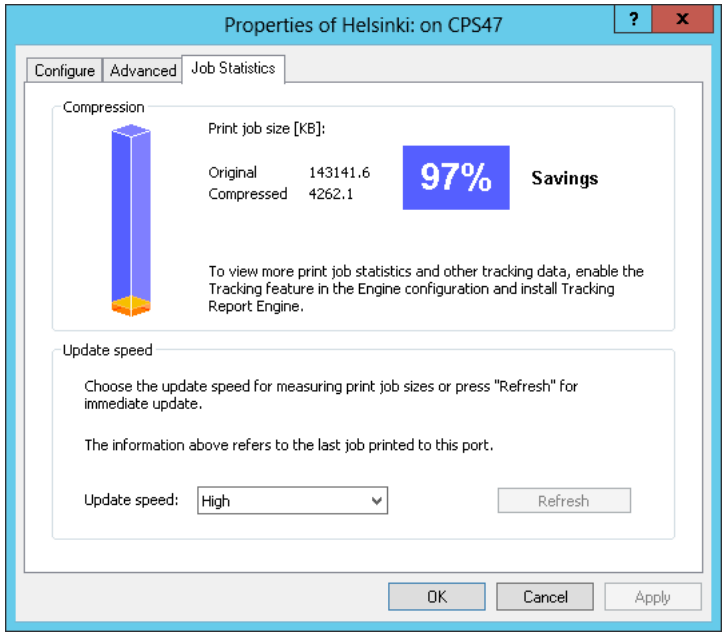

Properties of Helsinki: on CPS47
Configure
Advanced
Job Statistics
Compression
Print job size [KB]:
Original 143141.6
Compressed 4262.1
97%
Savings
To view more print job statistics and other tracking data, enable the Tracking feature in the Engine configuration and install Tracking Report Engine.
Update speed
Choose the update speed for measuring print job sizes or press "Refresh" for immediate update.
The information above refers to the last job printed to this port.
Update speed:
High
Refresh
OK
Cancel
Apply

Illus. 24 Port settings: JOB STATISTICS tab

OK

– Save your settings by clicking OK.

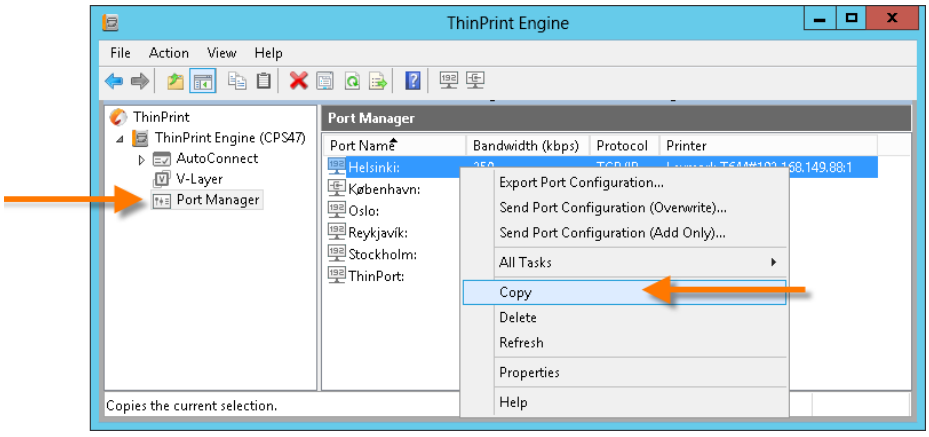
Distributing port configuration

The following strategies are available for creating the same configuration for ThinPrint Ports on multiple servers:

- Remote configuration of ThinPrint Ports (Page 24)
- Copying port properties with Copy&Paste (see below)
- Export to an .xml file and import to target servers (see below)
- Sending port configuration to target servers (see below)

Copy-and-Paste

– Open the ThinPrint Engine configuration console (Page 24).
– Mark a port in a server's Port Manager (e.g. cps47 in Illus. 25) and select COPY from the context menu.
– Mark the Port Manager of a target server (e.g. cps48 in Illus. 26) and select PASTE from the context menu.



Illus. 25 Copy a port on a server

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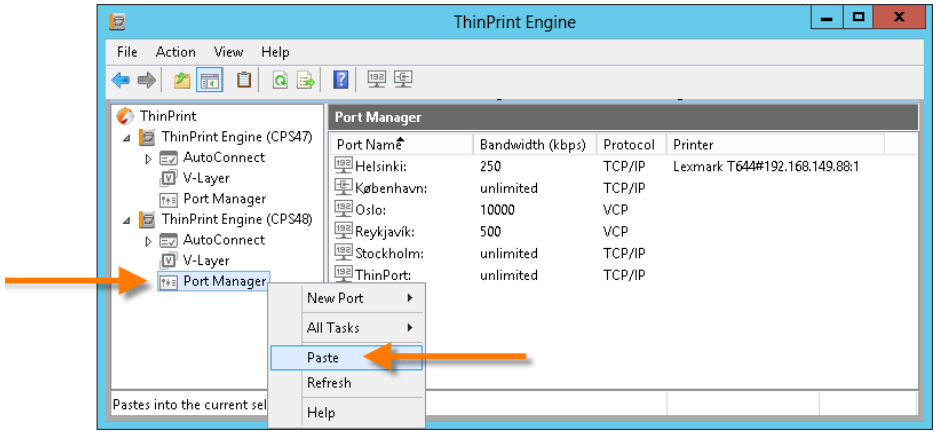
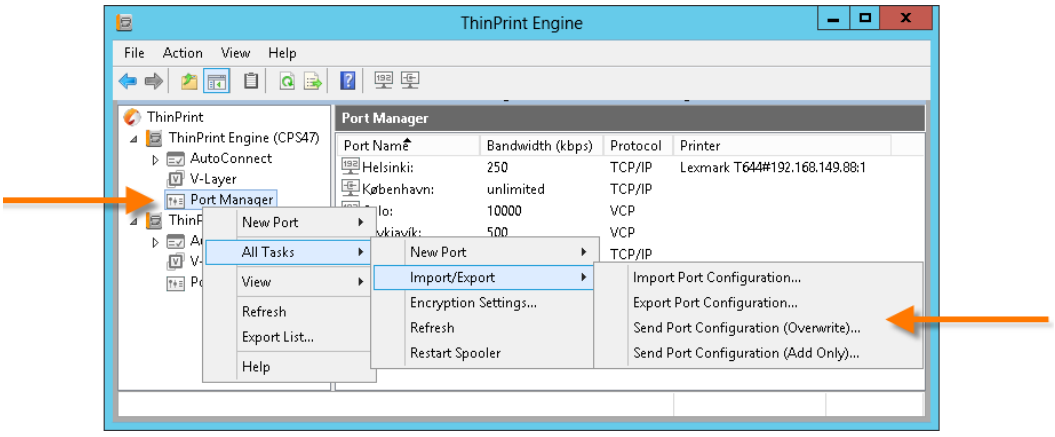


Illus. 26 Paste the port onto another server

Export/Import The following export and import functions are available:

EXPORT PORT CONFIGURATION	Exports the selected ThinPrint Port to an .xml file (Illus. 25)
IMPORT/EXPORT⟶ EXPORT PORT CONFIGURATION	Exports all ThinPrint Ports to an .xml file if no port is selected (Illus. 27)
IMPORT/EXPORT⟶ IMPORT PORT CONFIGURATION	Imports ThinPrint Ports from an .xml file (Illus. 27)



Illus. 27 Exporting, importing, or sending all ThinPrint Ports

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Sending port configuration

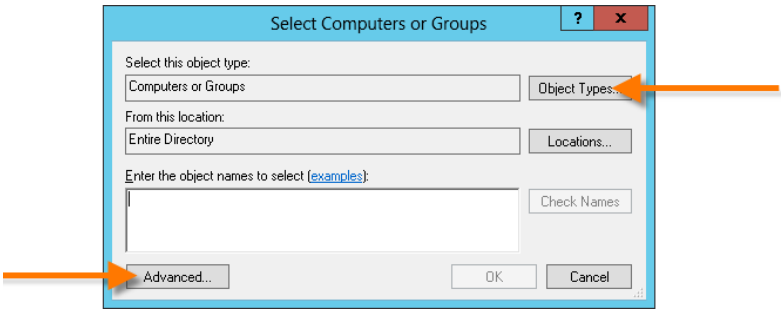
The SEND PORT CONFIGURATION function sends ThinPrint Ports to other servers or server groups. There are various modes:

SEND PORT CONFIGURATION (OVERWRITE)	Sends the selected ThinPrint Port; a port with the same name on the target system will be overwritten (Illus. 25)
SEND PORT CONFIGURATION (ADD ONLY)	Sends the selected ThinPrint Port; a port with the same name on the target system will **not** be overwritten (Illus. 25)
IMPORT/EXPORT⟶ SEND PORT CONFIGURATION (OVERWRITE)	Send all ThinPrint Ports; ports with the same name on the target system will be overwritten (Illus. 27)
IMPORT/EXPORT⟶ SEND PORT CONFIGURATION (ADD ONLY)	Send all ThinPrint Ports; ports with the same name on the target system will **not** be overwritten (Illus. 27)

ThinPrint Ports that already exist on the target computer, but not on the sending computer remain unchanged.

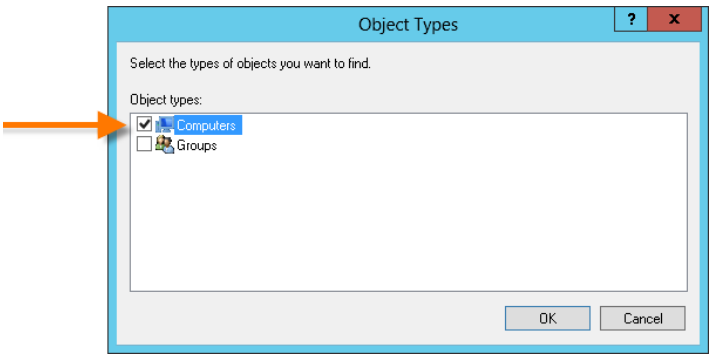
Procedure when sending

– Selecting the send option will open the dialog in Illus. 28.



Illus. 28 Dialog for sending properties

– To improve clarity, first select OBJECT TYPES, and disable GROUPS (Illus. 29). Click OK to confirm.
– Select ADVANCED (Illus. 28) and then FIND NOW (Illus. 30).



Illus. 29 Limiting the selection to computers

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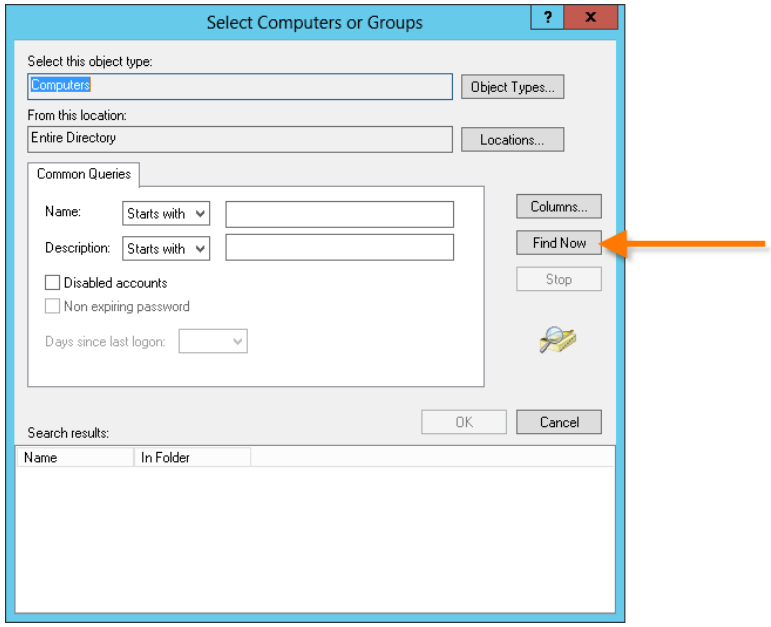
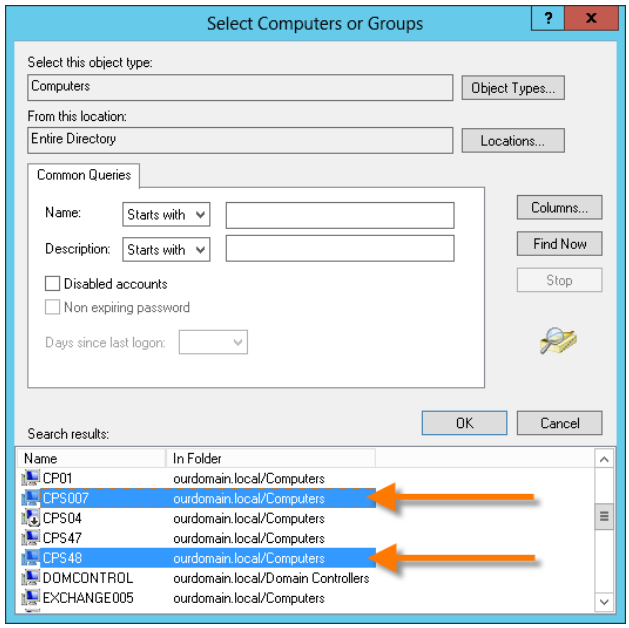


Illus. 30 Finding target servers

– Mark all target servers and click OK to confirm (Illus. 31).

Caution! You are influencing the configuration of remote computers. Check once more that you really want to send the configured ThinPrint Ports to the selected servers. A confirmation prompt gives you the option to cancel the process.



Illus. 31 Selecting target servers

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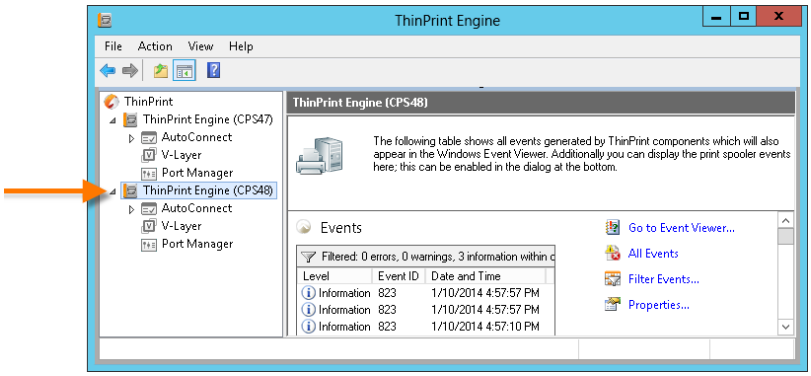
Note! If you receive an error message when sending, create a connection to the target computer with the MMC, using the relevant ThinPrint Engine node for remote configuration (Page 24)and repeat the send process from the source computer while keeping the console open (Illus. 32).


ThinPrint Engine
File Action View Help
ThinPrint
ThinPrint Engine (CPS47)
AutoConnect
V-Layer
Port Manager
ThinPrint Engine (CPS48)
AutoConnect
V-Layer
Port Manager
ThinPrint Engine (CPS48)
The following table shows all events generated by ThinPrint components which will also appear in the Windows Event Viewer. Additionally you can display the print spooler events here; this can be enabled in the dialog at the bottom.
Events
Filtered: 0 errors, 0 warnings, 3 information within c
Level Event ID Date and Time
Information 823 1/10/2014 4:57:57 PM
Information 823 1/10/2014 4:57:57 PM
Information 823 1/10/2014 4:57:10 PM
Go to Event Viewer...
All Events
Filter Events...
Properties...

Illus. 32 Create a connection to the target computer with the MMC (here: arrow to CPS48) and repeat send process from source computer (here: CPS47)

Attaching printers to ThinPrint Ports

General information about creating ThinPrint printers can be found in the technical descriptions *ThinPrint addressing* and *ThinPrint Ports*.

There's one last step after installing and configuring the ThinPrint Engine: setting up *printers* on the *ThinPrint Ports*.

Which protocol?

If you are working with several ThinPrint Ports, each with a different protocol, then check port configuration before printer installation to see which ThinPrint Port supports which protocol (Page 25).

ThinPrint naming conventions

Please also refer to the following information when adding printers to the server *manually* (without Management Center or Management Services).

For simplicity's sake, only standard addressing is considered here; reversed addressing can be found in the chart on Page 27, and addressing ThinPrint Connection Service Ports is explained in detail in the ThinPrint Connection Service manual.

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It is irrelevant to a ThinPrint printer name whether the object represents a traditional (native) printer driver or the Output Gateway "printer driver". The ThinPrint printer name is composed according to the network protocol in use:

Network protocol	Names of printer objects	
TCP/IP	**Either:**	*printer_name#client_name:printer_ID*
	Example:	Kyocera FS-850#client1:3
	Or:	*printer_name#IP_address:printer_ID*
	Example:	Kyocera FS-850#191.168.1.17:3
Use Virtual Channel Gateway (RDP/ICA/PCoIP)	**Either:**	*printer_name#user_name:printer_ID*
	Example:	Kyocera FS-850#administrator:3
	Or:	*printer_name#:printer_ID*
	Example:	Kyocera FS-850#:3
LPD	**Either:**	*printer_name#client_name*
	Example:	Kyocera FS-850#printer1
	Or:	*printer_name#IP_address*
	Example:	Kyocera FS-850#191.168.1.18

client_name

Client name with **TCP/IP** and **LPD**[5] means the real name of the client in the network (= host name). Alternatively, the client's IP address can be used; this is especially necessary when there are difficulties with the name resolution.

Note! With TCP/IP it is possible to send print data to any client computer running a ThinPrint Client – independent of a session (on a terminal server or virtual desktop).

printer_ID

At the client[6], the ThinPrint Client automatically assigns every installed printer an ID (see Illus. 92, Page 75). The printer_ID can be omitted if

- there is only one printer installed on the client
- printing should take place on the ThinPrint Client's *current printer*
- if, firstly, all the print jobs are sent via Virtual Channel Gateway and, secondly, the share name entered in Dynamic Printer Matrix' TARGET column and the printer name on the client machine match (= if the variable %LCPRN% can be used in the TARGET column, Illus. 145).

5 See the technical description *ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD*

6 i.e., a workstation, a thin client (terminal), a gateway appliance or a local print server

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printer_name

The printer name can be anything you like. It is nonetheless recommended that it is the same as the printer name at the client machine.

Example 1:

Client

Client name	client1
IP Address	192.168.1.17
Printer	Lexmark T644

ThinPrint Client assigned this printer ID **2** (Illus. 92).

Server `Lexmark T644#client1:2`

Or

`Lexmark T644#192.168.1.17:2`

With the **Use Virtual Channel Gateway** protocol type, it is possible to print from print servers via RDP, ICA or PCoIP. Print jobs are then sent via TCP/IP from the ThinPrint Engine installed on the print server to the Virtual Channel Gateway on the terminal server or virtual desktop and from there via RDP, ICA or PCoIP to the client. The naming convention for the printers on the print server is the same as for RDP, ICA or PCoIP.

The RDP, ICA and PCoIP protocol assumes all communication with the client, including the client's unambiguous identification. The printer name is composed of:

Description of the **Printer** and the **Printer ID**

Example 2:

Kyocera FS-850 is to be printed via ThinPrint using RDP. If multiple printers are installed and ID **3** was assigned to the printer by the ThinPrint Client, the printer name could be:

`Kyocera#:3` (# before :)

oder `Kyocera FS-850#_:3` (underline before :)

If Kyocera FS-850 is ThinPrint Client's *Current Printer* or the Dynamic Printer Matrix is in use (and share name and client printer name match), this name is sufficient:

`Kyocera FS-850`

Note! With the RDP, ICA or PCoIP protocol print data is sent automatically to the client from whose session the print data was created.

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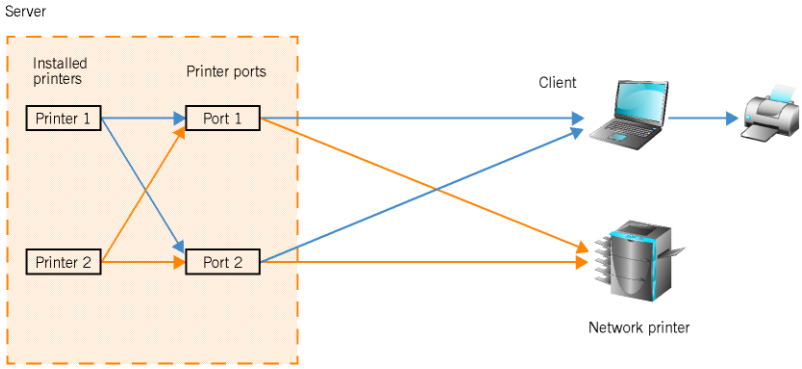
Port pooling

Pooling printer ports with ThinPrint means you can attach printer objects to several ThinPrint Ports (Illus. 33 and 34) – also known as **printer pooling**. This has the following advantages:

- Improved performance
- Little chance of blockage from very large or “hanging” print jobs
- Fewer printer ports on the server (because multiple printers can be connected to a few ports)
- Bandwidth limitation is more clearly defined



Illus. 33 Principle of port pooling

ThinPrint Port pooling is supported by:

- ThinPrint Ports
- Output Gateway
- AutoConnect
- Virtual Channel Gateway
- Connection Service
- Management Center
- Management Services

Port pooling is mainly used to improve print performance. It should be remembered though, that all ThinPrint Ports in a pool should have the same settings – this can be done automatically using the Management Center[7] or Management Services[8]. Port pooling with ThinPrint Ports in combination with Output Gateways, Management Center/Services and AutoConnect, however, brings more than maximum performance; it also makes administration particularly easy and convenient.

When setting bandwidth, note that the bandwidths of a pool are added to each other when all ThinPrint Ports print simultaneously. Detailed information can be found in the technical description *ThinPrint Ports*.

7 http://download.cortado.com/docu/ThinPrint/MC/en/2.2/

8 http://download.cortado.com/docu/ThinPrint/Tpms/en/1.0/

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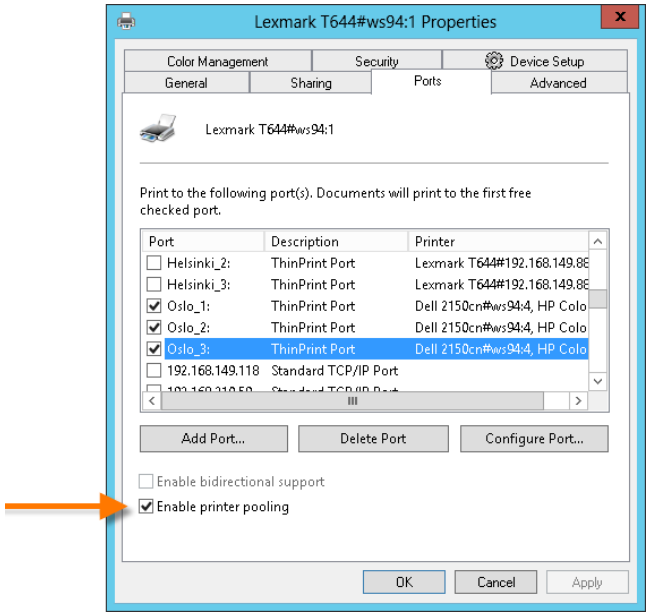


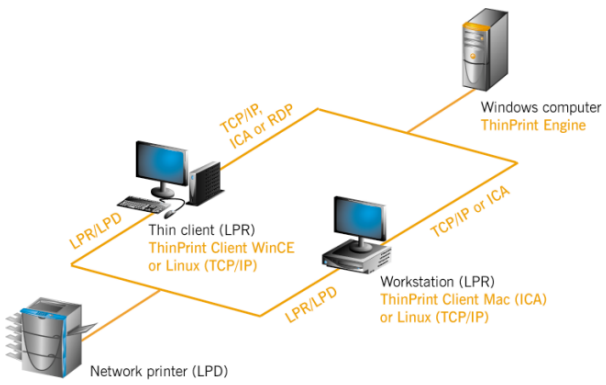
Illus. 34 Enabling port pooling manually (example)

LPR/LPD printing with Linux, Mac or Windows CE clients

Linux, Mac OS and Windows CE clients are capable of forwarding print jobs to LPD devices. Either the ThinPrint Client Linux, Mac or WinCE is installed on a thin client or workstation and can then receive ThinPrint print jobs (via TCP/IP, ICA or RDP) and send them directly to internal or external print servers of network printers (via LPR/LPD, Illus. 35).

ThinPrint Clients for Linux, Mac and Windows CE operating systems support LPR/LPD printing.

Note! For more information on sending print jobs directly via LPR/LPD with ThinPrint Engine, see also the technical description *ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD*.



Illus. 35 LPR/LPD printing via Linux, Mac or Windows CE clients

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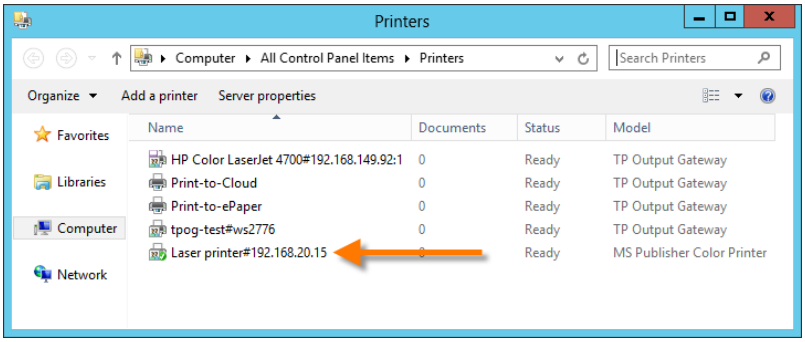
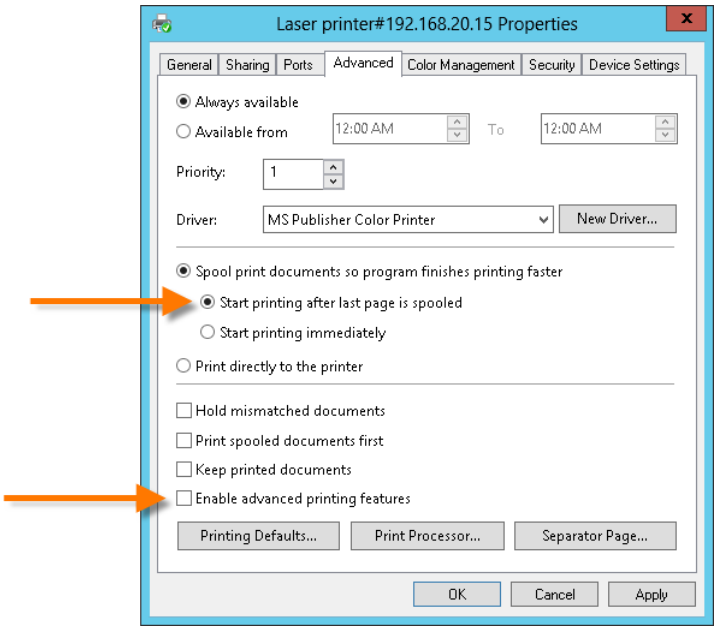
Preparations on the central print server

– Create a new printer. For TCP/IP this must contain the Linux, Mac or Windows CE client's address in its name. Assign a ThinPrint Port that uses TCP/IP, ICA, or RDP as print protocol (e.g., ThinPort:) and share the printer (Illus. 36).



Illus. 36 Printer set up, printing to a Linux, Mac or Windows CE device

– Make sure that the printer completely spools the print data on the hard drive before sending. To do so, select GENERAL under PRINTER PROPERTIES (Illus. 37).
– Select START PRINTING AFTER LAST PAGE IS SPOOLED.
– Disable the Advanced Printing Features.



Illus. 37 Recommended settings on the server for client-side LPD printing

ThinPrint Output Gateway

TP Output Gateway is a virtual printer driver (see the MODEL column in Illus. 38) that makes it possible to render print data on a remote machine (workstation or print server) using the native printer driver which is installed there. Because no other printer driver besides the Output Gateway is required on a terminal server, virtual desktop or workstation, this print method is called **Driver Free Printing**. In this sense, of course, "Driver Free" only refers to the terminal server or the desktop (Illus. 39). See also V-Layer (Page 51).

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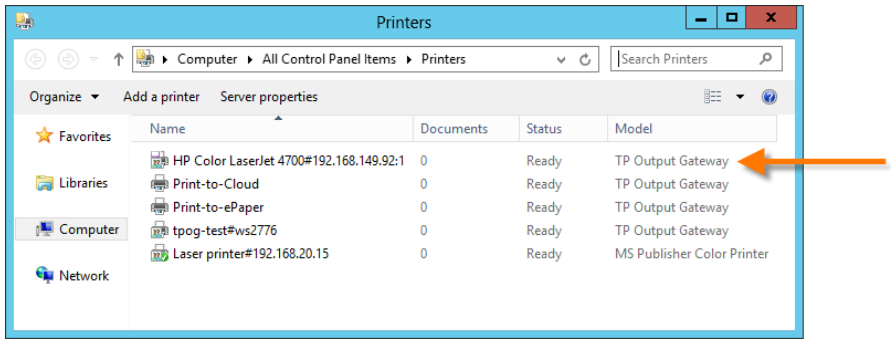
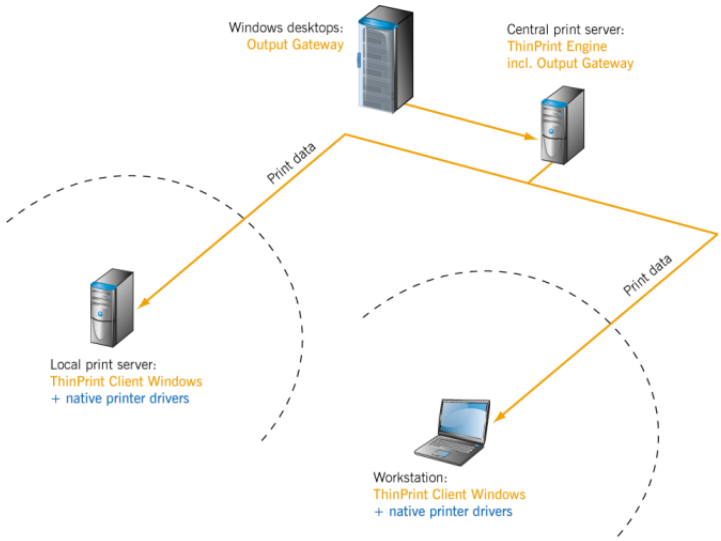
Note! ThinPrint Output Gateway will only function with ThinPrint Clients installed on machines with a Windows operating system; exception: V-Layer. Relevant printer drivers must be installed on these machines.



Illus. 38 TP Output Gateway driver in the server's printers folder



Illus. 39 Driver Free Printing: Output Gateway on terminal servers, virtual desktops and central print server; native printer drivers on workstations and local print servers running Windows

With Driver Free Printing, print data is sent from the terminal server or virtual (or physical) desktop to the central print server and sent from there to the client machine in Windows' own EMF data format. From the print server to the client machine, it is also bandwidth controlled, compressed and streamed, and, if desired, encrypted.

Naming convention

You can treat the printer objects based on TP Output Gateway like any other printer object. Output Gateway printer objects can be created:

- Manually (using ADD PRINTER in the printers folder or in Print Management) or
- Using AutoConnect or
- Using ThinPrint Management Center[9]
- Using Management Services[10]

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If printer objects are created manually, they'll show only the default printer properties. When creating printer queues bear in mind the ThinPrint naming conventions. Example:

Example 3: Addressing the printer directly (TCP/IP printing)

Client

Client name	client1
ID	3
IP address	192.8.1.5
Printer name	HP LaserJet 5L

Server

Printer name	`HP LaserJet 5L#client1:3`
or	
Printer name	`HP LaserJet 5L#192.8.1.5:3`

Output Gateway printer objects can be created manually with the ADD PRINTER function in printers folder or in Print Management using THINPRINT as the manufacturer. The printers are to be connected to a ThinPrint Port.

Paper formats and trays

After adding an Output Gateway printer, a few default options are available for paper formats and paper sources (= selection of paper trays or manual feed, Illus. 47). You can add further options – provided they are supported by the printer drivers on the client machine(s).

To do so, the following alternatives are available:

- For printers created by AutoConnect or Management Center:
  Automatic upload of printer properties from the ThinPrint Client to the server (see the *ThinPrint Engine on terminal servers* or *ThinPrint Management Center* manuals)
- For manually created printers:
  Set the Windows registry values for paper formats and sources on the server
- For V-Layer printer pairs (Page 51)

Presettings on the print server (administrators only)

The following settings can be configured in the server's printers folder or Print Management for all shared printer objects which use TP Output Gateway as their driver; as such they affect all printers which will be connected to a user session on a terminal server, virtual desktop or workstation (= desktop session).

9 http://download.cortado.com/docu/ThinPrint/MC/en/2.2/

10 http://download.cortado.com/docu/ThinPrint/Tpms/en/1.0/

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If it's too time-consuming to configure all Output Gateway objects one after another, you can use the Management Center which allows you to set up only the respective template printers on its template server. For more information see the *ThinPrint Management Center* manual.

– Select for example FILE⟶ PROPERTIES⟶ DEVICE SETUP for an Output Gateway object in the server's printers folder or Print Management.

Compression range

There are five options available for print data compression (Illus. 40):

- Normal — Lossless
- Optimal — Text without loss, good image quality
- Maximum — Text without loss, medium image quality
- Extreme — Text without loss, lower image quality
- No images — Only text will be printed

At this point you can set the range of compression levels that the users will be able to set, for example, OPTIMAL, and the level NORMAL is no longer available to users. The default compression level itself is set in the tab ADVANCED⟶ PRINTING DEFAULTS ⟶ COMPRESSION (Illus. 46, on Page 46).

ThinShare

see Page 21

SpeedCache

Additionally the option SPEEDCACHE can be enabled or disabled for users of a desktop session (Illus. 40). A ThinPrint Client v8.6 or later is required.

SpeedCache makes printing even faster and more efficient. It checks every print job, for whether it replicates graphic elements (such as logos) and, if so, sends them once only. Thereby, the volume of server/client communication is cut down, without creating additional processor load.

SpeedCache is not available for V-Layer printers – so even if chosen, it won't have any effect when using them.

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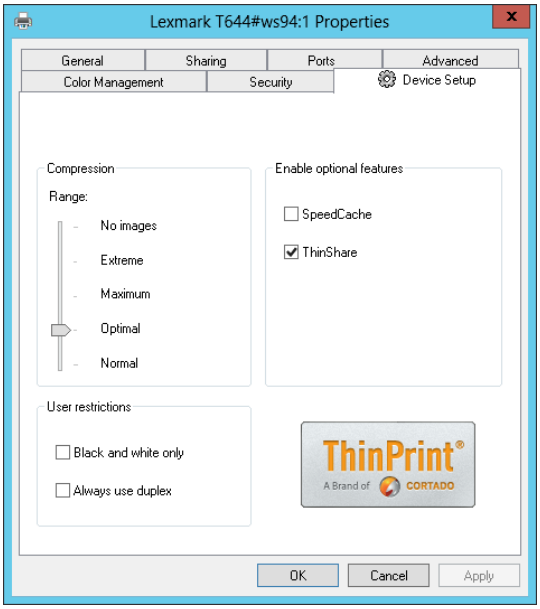
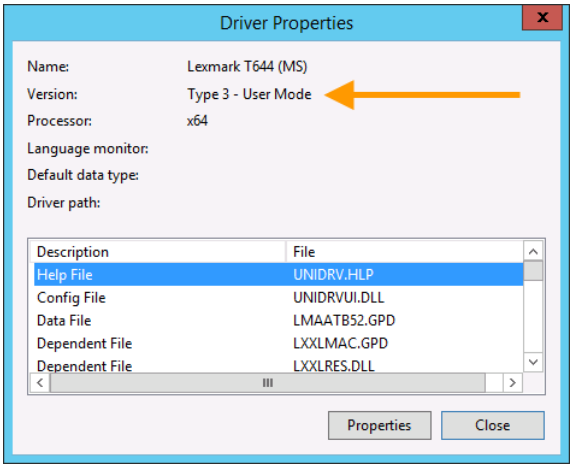


Illus. 40 Range of compression levels, ThinShare and other options available per printer

Note! From Windows 2012 R2 typ-4 drivers can't be connected to third-party printer ports. That's why use type-3 drivers with ThinPrint Ports (Illus. 41).



Illus. 41 Example for a type-3 driver, here: *Lexmark T644 (MS)*

User policies

The USER RESTRICTIONS group offers the options BLACK AND WHITE ONLY for presetting gray-scale printing and ALWAYS USE DUPLEX for printing on both sides (Illus. 40 bottom). As a result, the respective options will be **grayed out** for users in their sessions (see the arrows pointing to the options COLOR and NONE – for print on both sides – in Illus. 42).

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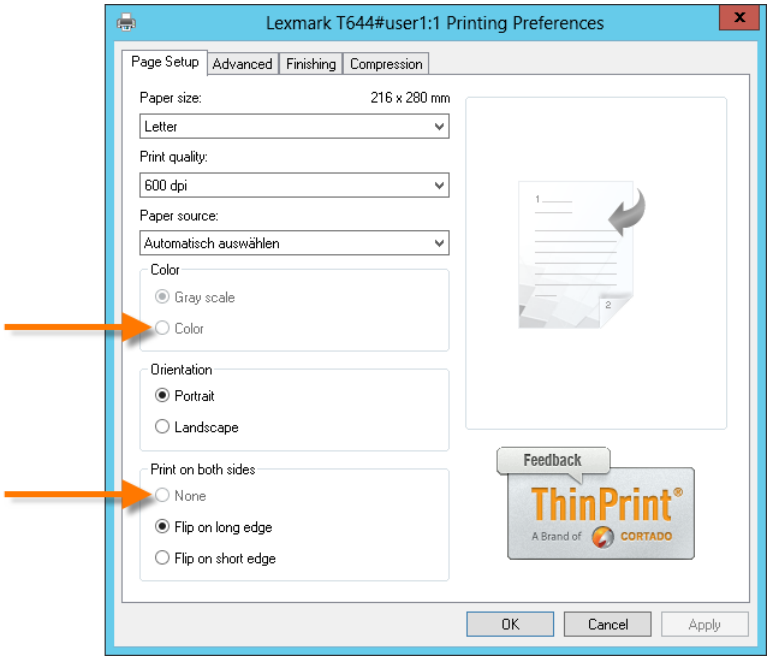
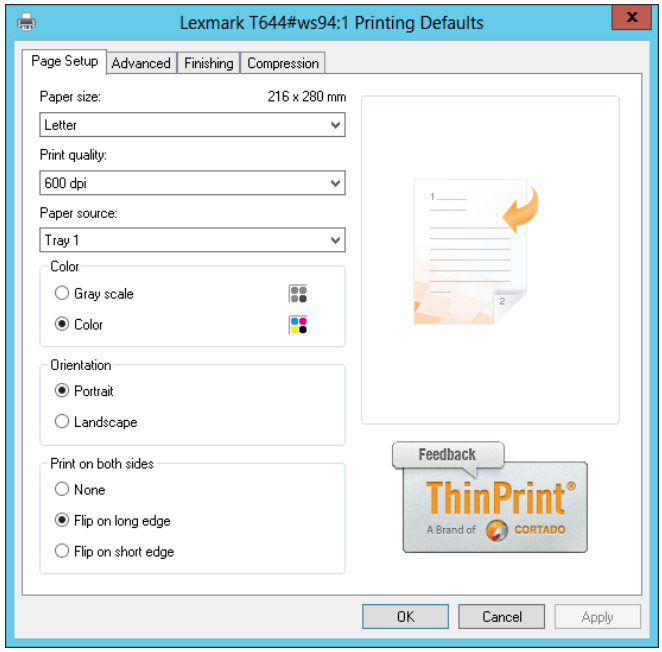


Illus. 42 COLOR and simplex printing (NONE) grayed out for users

Page Setup

Select the **PAGE SETUP tab** in ADVANCED⟶ PRINTING DEFAULTS to change paper and color presettings; e.g., LETTER or A4 as paper size (Illus. 43). Additionally you can select from the following settings for double-sided printing: LONG EDGE or SHORT EDGE (= turn over edge).



Illus. 43 Presetting paper size, print resolution, color, etc., on the server

Advanced

In the **ADVANCED tab** you can preset for print jobs to be sent to the printer without a pop-up menu (PRINT DIRECTLY). Alternatively, either a PRINT PREVIEW (Illus. 50) or the native printer driver's user interface (OPEN MY PRINTING PREFERENCES, Illus. 51) can appear on a Windows workstation; both options allow the user to access all other printer specific settings. With V-Layers only PRINT DIRECTLY is possible.

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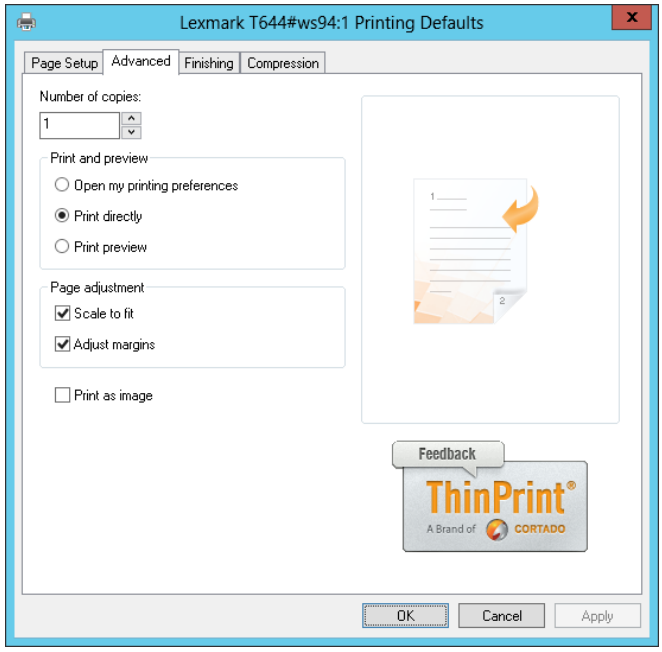
PAGE ADJUSTMENT offers options to alter the default settings if the printable area of the document and the printer driver's paper format don't match. The option SCALE TO FIT changes the size of the printout, ADJUST MARGINS moves the print area (Illus. 44). It is recommended to leave both settings enabled.

You can use the option PRINT AS IMAGE to solve layout problems. To maintain print quality, please follow the steps described in the *Solving problems with fonts* guide beforehand.



Illus. 44 Presetting scaling and margin adjustment on the server

Finishing

Which **finishing options** are visible in the Output Gateway user interface (Illus. 45) depends, firstly on the printer driver being used, and secondly, on which version of the file **TPPrintTicket.dll** is present. This file provides the finishing options of specific native printer drivers in the Output Gateway GUI, and is located on the central print server in C:\Program Files\Common Files\ThinPrint

- The current version of TPPrintTicket.dll can be downloaded here: www.thinprint.com⟶ RESOURCES & SUPPORT⟶ SOFTWARE⟶ THINPRINT CLIENT & TOOLS⟶ SOFTWARE TOOLS & FEATURE RELEASES⟶ PRINT TICKET EXTENSION
- After updating the TPPrintTicket.dll, re-create the relevant V-Layer printer objects. To do so:
  - either – using the V-Layer component – disable the relevant V-Layers, then re-enable them (Page 51)
  - or – using the Management Center[11] – remove the relevant V-Layer pairs, then re-create them
  - or – with Driver Free Printer mode using the Management Center – remove the relevant Output Gateway printers, then re-create them

11 http://download.cortado.com/docu/ThinPrint/MC/en/2.2/

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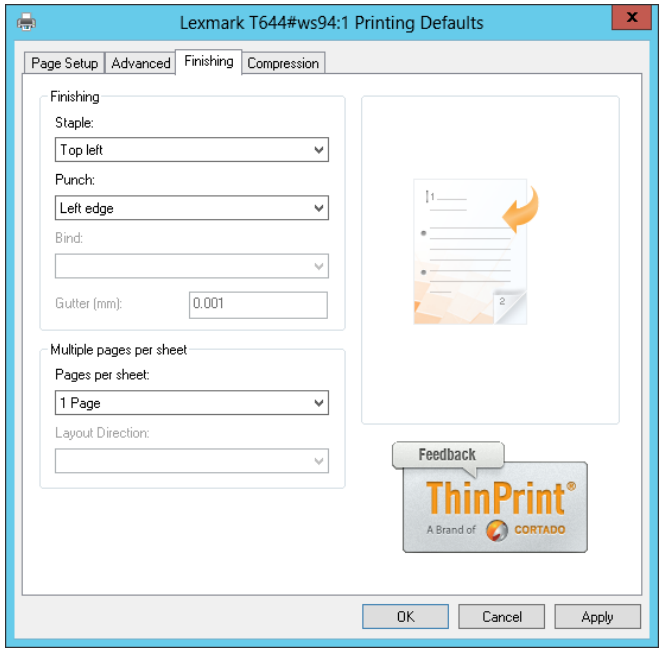
If one of your printers has finishing options that are not available in the Output Gateway user interface, please use the Finishing Detector to send this information to ThinPrint or Cortado.[12]



Illus. 45 Finishing options – retrieved from a Lexmark driver

12 Requirement: The printer must support Print Tickets from Microsoft. Download ThinPrint Finishing Detector (Page 126) to find out which finishing options are supported by your printer models. Install this tool on the machine where the printer drivers are installed.

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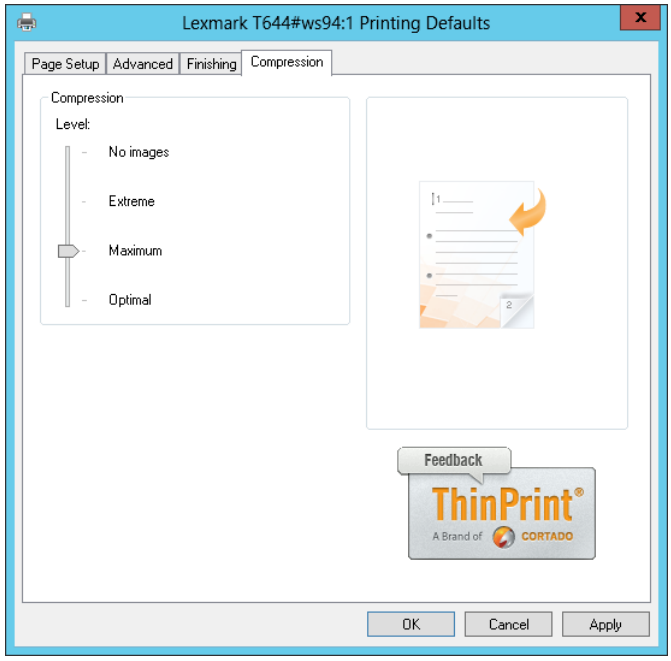
Compression level

In the **Compression tab**, you can set the default level of compression for users (Illus. 46). The number of levels shown depends on the configured compression range (Illus. 40).



Illus. 46 Presetting compression level on the server

The settings shown in Illus. 43 to 46 will be the default options in a desktop session. Users can change them within the sessions (see below).

Settings in a desktop session

Assuming the Output Gateway printer objects have been created using the V-Layer component of ThinPrint Engine (Page 51) or by using ThinPrint Management Center on the print server, the following properties of native drivers can be displayed in the Output Gateway user interface:

- Color/grayscale
- Paper sources
- Print on both sides (duplex/simplex)
- Finishing options such as staple, punch, binding
- Print resolution
- Paper size
- Comment and location

In their desktop session the users can change these printer settings (except comment and location):

- either in their printers folder or Print Management – in which case the changes will apply to all applications of this session
- or within an application in the printer properties dialogue before printing – in this case they apply only to this application

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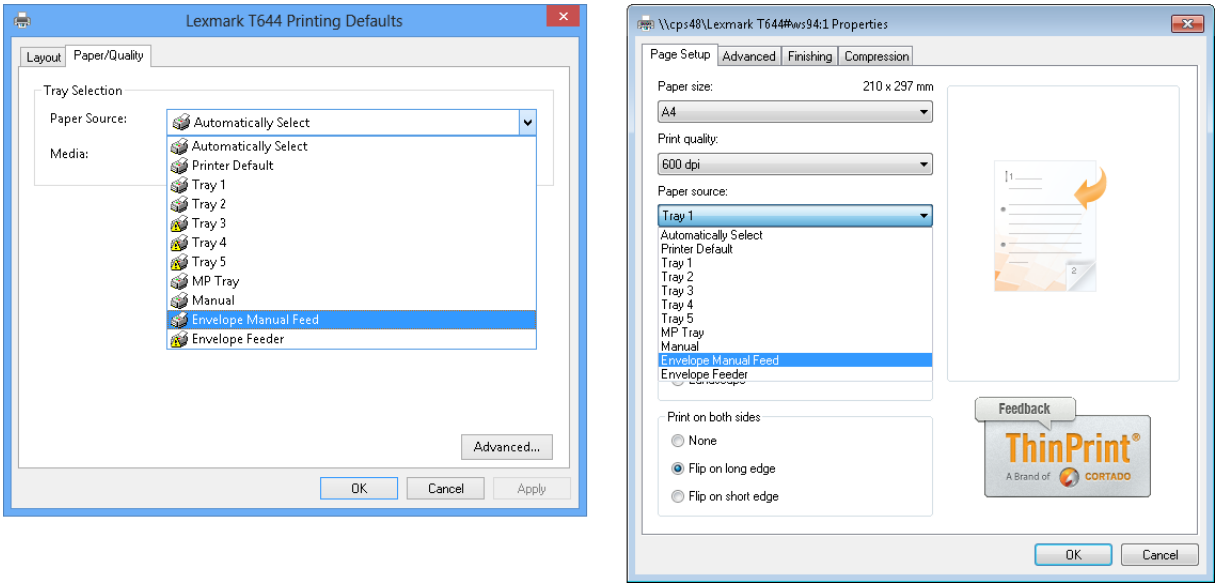
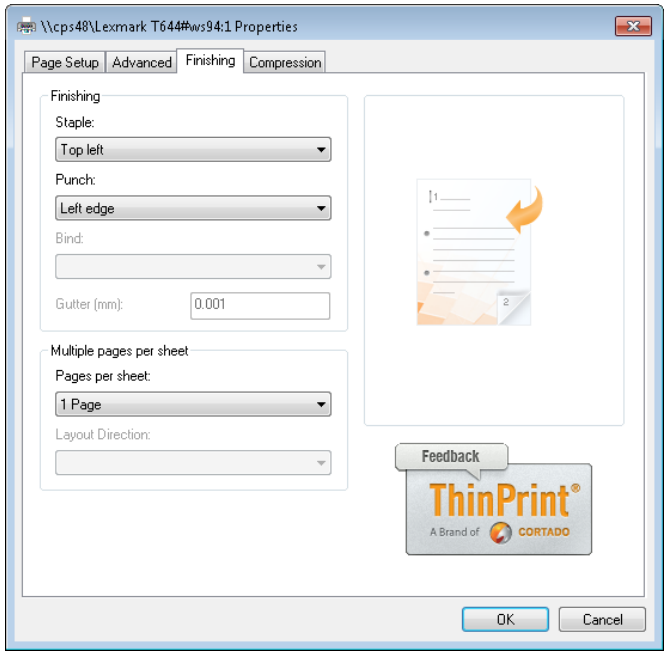
The following settings can be edited in the PAGE SETUP tab (Illus. 47): PAPER SIZE, PRINT QUALITY, PAPER SOURCE, COLOR, ORIENTATION and PRINT ON BOTH SIDES.



Illus. 47 Display of paper sources in a native driver's user interface (left) and in the Output Gateway interface (right)

Finishing

If a printer supports finishing options, the users can find them in the FINISHING tab (Illus. 48). Here they can set, for example, where staples should be located on the printout, where bindings should be set or hole punches made. They can also determine here how many pages should be printed per sheet, and in which order they are printed.



Illus. 48 Finishing options in a session

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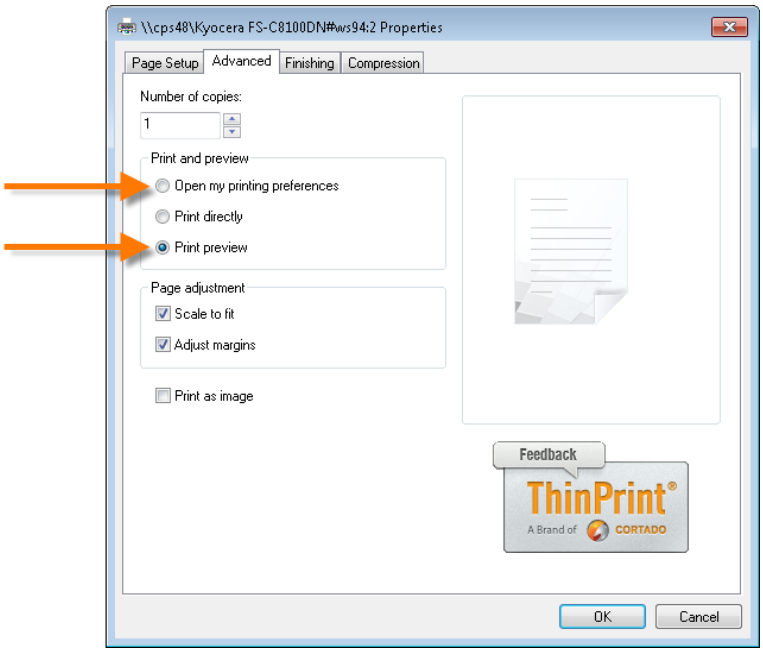
Printing with preview

For printer objects that use Output Gateway as their driver, users can select a print preview (lower arrow in Illus. 49). In that case the print job will appear in the ThinPrint viewer (Illus. 50); this requires that the print jobs are sent to a Windows workstation, where the jobs are rendered using the native driver (and not with V-Layer). Here the users can:

- Print to any printer that is connected to the client computer or can be reached from it
- Navigate through documents with more than one page
- Zoom
- Cancel print job reception
- Save print job[13]



Illus. 49 Print mode, scaling and margin adjustment and PRINT AS IMAGE in a session

13 File extension: .tpf (compressed EMF data); the ThinPrint preview program (= TPView.exe) is needed for reloading a saved print job; see Page 126).

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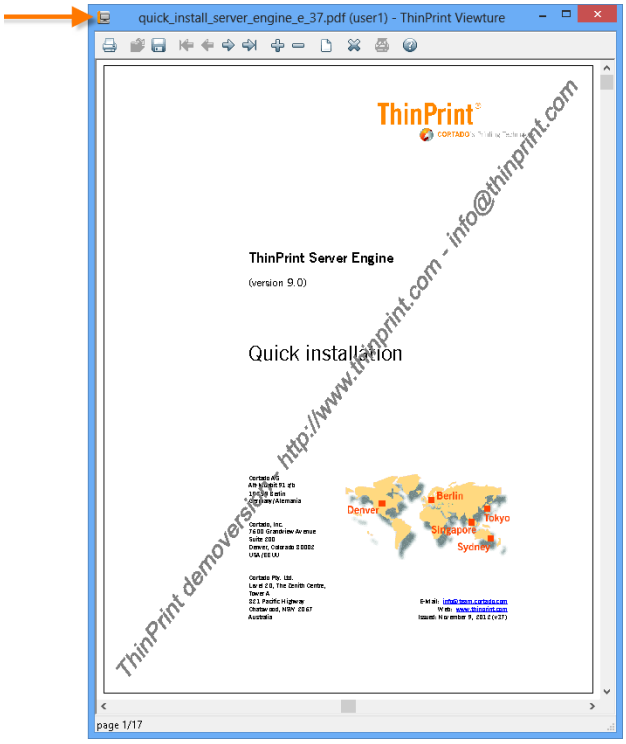

Illus. 50 ThinPrint preview on the client computer (water mark = demo license key active)

When printing with preview in a desktop session, the print options can be opened in the Output Gateway interface (Illus. 47 right), before printing. Once the client machine has received it, the print job is displayed in a preview window (Illus. 50). The print options can then be opened in the interface of the native printer driver (Illus. 47 left).

Open my printing preferences

If there is a printer function which is not supported by the Output Gateway's user interface the users can use the native driver's own interface (Illus. 51). To do this, they select OPEN MY PRINTING PREFERENCES (upper arrow in Illus. 49). This also requires that the print jobs are sent to a Windows workstation, on which the jobs are rendered using the native driver (and not with V-Layer).

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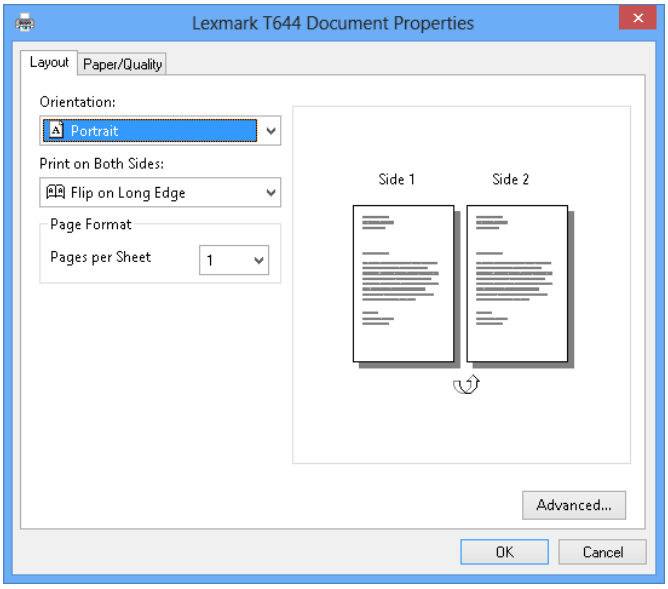

Illus. 51 Native driver properties will open automatically on a workstation

Changing Output Gateway print dialogue's language

The Output Gateway print dialog (Illus. 46) is displayed for the users in the language that was chosen during the installation of the ThinPrint Engine on the terminal server (English, German, Spanish or French). This is set using the Windows registry value:

`hkey_local_machine\software\ThinPrint\Lang`

With Windows multi-language packs this print dialog can be displayed in the display language of the respective user (Illus. 52). To do so, the registry value **Lang** is to be changed from enu, deu, fra or esn to **def**. This single setting is sufficient if, for instance, each terminal server user is to be shown the Output Gateway print dialogue in the same language as her or his Windows desktop.

If, however, individual users are to be assigned a different language, the following value must be set – within the sessions – to one of the Language abbreviations in the table below:

`hkey_current_user\software\ThinPrint\Lang`

Chinese, traditional (CHT)	Greek (ELL)	Portuguese (PTG)
Chinese, simplified (CHS)	Hungarian (HUN)	Russian (RUS)
Czech (CSY)	Italian (ITA)	Spanish (ESN)
English, United States (ENU)	Japanese (JPN)	Swedish (SVE)
French (FRA)	Korean (KOR)	Thai (THA)
German (DEU)	Polish (PLK)	

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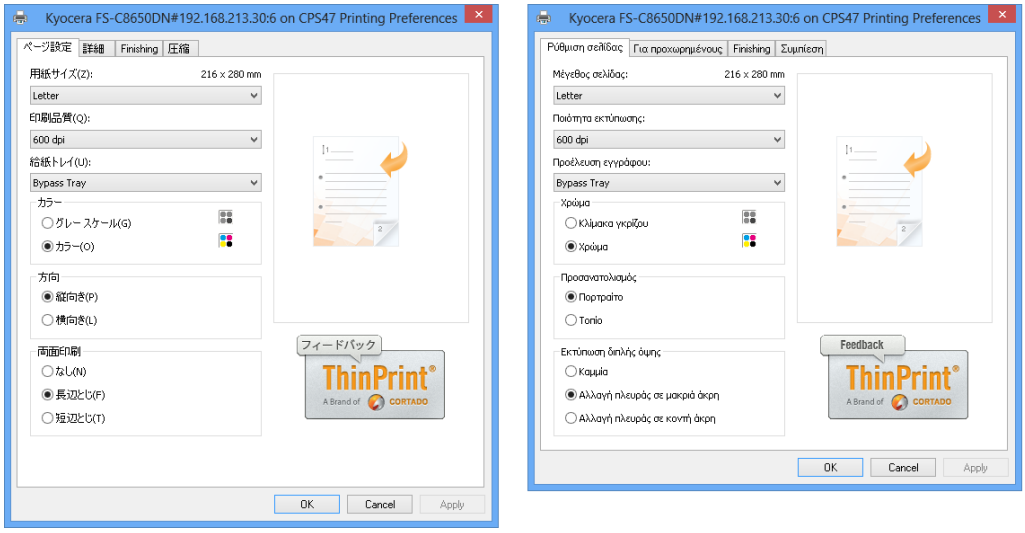

Illus. 52 Output Gateway's localization (examples for JPN and ELL)

V-Layer

Scenario

With V-Layer, print data is sent from the terminal server or virtual (or physical) desktop to the central print server in Windows' own EMF data format (Illus. 53). On the central print server, it is sent from the ThinPrint Output Gateway to the native printer driver. One advantage of V-Layer is that shared printers on the central print server are not connected to ThinPrint Ports and thus do not have to conform to any particular naming convention. Furthermore ThinShare can be used here (Page 21).

Use the V-Layer component if:

- Non-Windows clients are used or
- Printer drivers are to be centralized on a print server or
- VirtualCopy is required (see below) or
- Specific printer properties, such as finishing options, are required and Management Center/Services isn't available or not used

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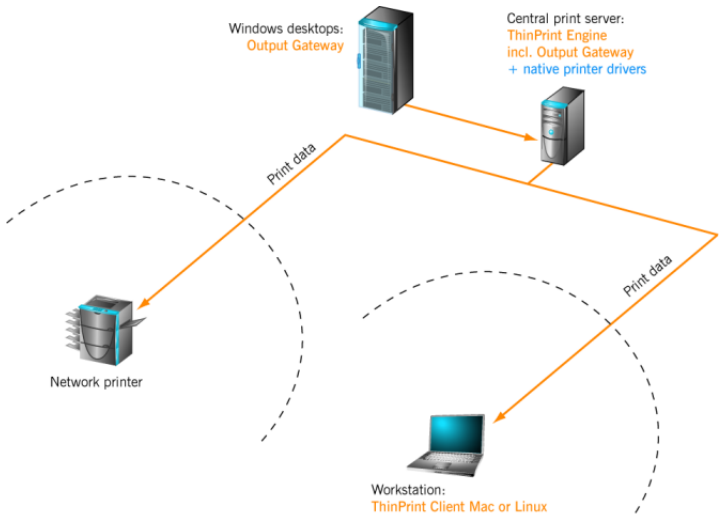
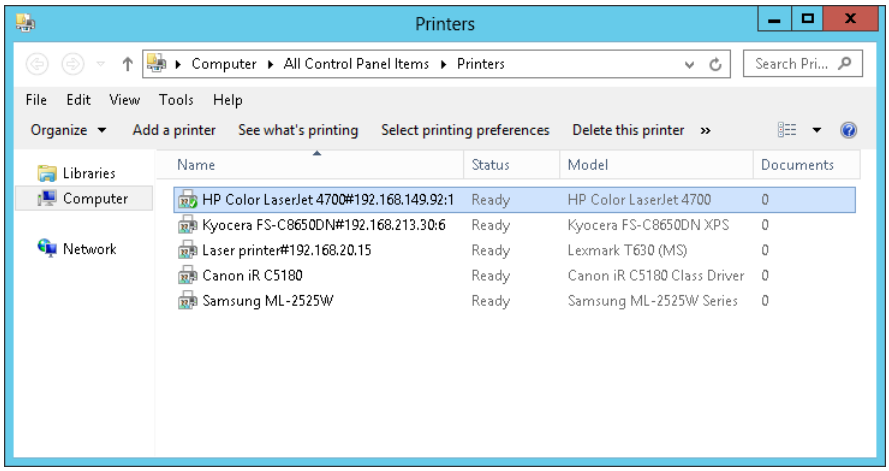


Illus. 53 V-Layer: Output Gateway on terminal servers, virtual desktops or workstations, but native printer drivers only on the central print server

Setup

- Install ThinPrint Engine on the central, dedicated print server (see the quick installation guide).
- Install ThinPrint Output Gateway on each terminal server, virtual desktop or workstation (included in Terminal Server Extension and Desktop Extension).
- On the central print server, add all necessary printers with their native printer drivers, and share them.
- If you want to send the print jobs using the ThinPrint Engine rename the printers according to the ThinPrint naming conventions (Page 33) – e.g. HP Color LaserJet 4700 and Kyocera FS-C8650DN in Illus. 54 – and attach them to ThinPrint Ports.[14] Otherwise attach them to Standard TCP/IP Ports or to LPR ports.


Printers
Computer ▸ All Control Panel Items ▸ Printers
Search Pri...
File Edit View Tools Help
Organize Add a printer See what's printing Select printing preferences Delete this printer
Libraries
Computer
Network
Name Status Model Documents
HP Color LaserJet 4700#192.168.149.92:1 Ready HP Color LaserJet 4700 0
Kyocera FS-C8650DN#192.168.213.30:6 Ready Kyocera FS-C8650DN XPS 0
Laser printer#192.168.20.15 Ready Lexmark T630 (MS) 0
Canon iR C5180 Ready Canon iR C5180 Class Driver 0
Samsung ML-2525W Ready Samsung ML-2525W Series 0

Illus. 54 Printers with native drivers on a central print server (example)

14 It is recommended to use Port pooling (Page 36) or to attach each printer to a separate ThinPrint Port.

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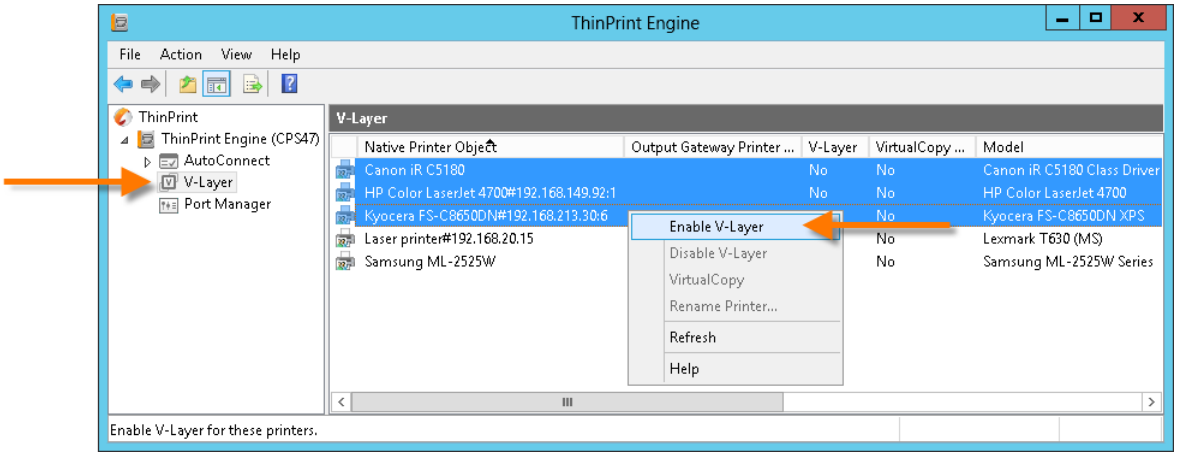
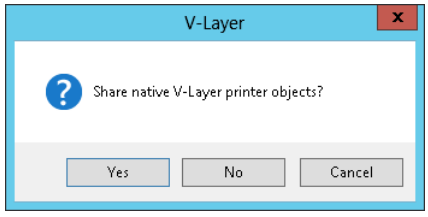
V-Layer configuration

To convert the printers, you use the **V-Layer** configuration tool, which is a component of **ThinPrint Engine**. For each (selected) printer, the V-Layer configuration (Illus. 55) creates a second printer, which uses TP Output Gateway as the driver. Then it moves the share from the old to the new printer. Later, the new, shared printer receives the print jobs (from a desktop session) and transmits them to the second printer of the pair (Illus. 57).

- Mark the relevant shared printers and select ENABLE V-LAYER in the context menu (Illus. 55). Through this, the Output Gateway object gets the share name of the native printer object.
- Additionally, decide whether only the Output Gateway object is to be shared, or both it and the (old) native printer object as well (Illus. 56). Its share name has an _n_ added (Illus. 57).



Illus. 55 Enabling V-Layer (example)



Illus. 56 Also share the native printer object(s)?

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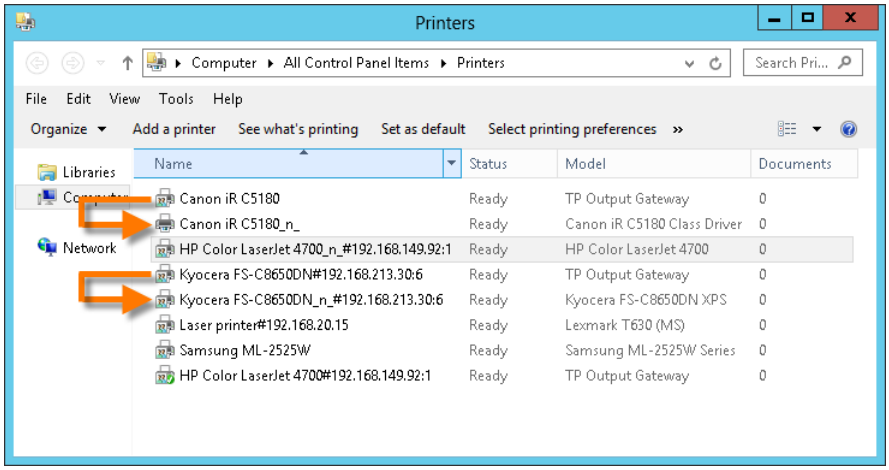

Printers
Computer ▸ All Control Panel Items ▸ Printers
Search Pri...
File Edit View Tools Help
Organize Add a printer See what's printing Set as default Select printing preferences
Libraries
Network
Name Status Model Documents
Canon iR C5180 Ready TP Output Gateway 0
Canon iR C5180_n_ Ready Canon iR C5180 Class Driver 0
HP Color LaserJet 4700_n_#192.168.149.92:1 Ready HP Color LaserJet 4700 0
Kyocera FS-C8650DN#192.168.213.30:6 Ready TP Output Gateway 0
Kyocera FS-C8650DN_n_#192.168.213.30:6 Ready Kyocera FS-C8650DN XPS 0
Laser printer#192.168.20.15 Ready Lexmark T630 (MS) 0
Samsung ML-2525W Ready Samsung ML-2525W Series 0
HP Color LaserJet 4700#192.168.149.92:1 Ready TP Output Gateway 0

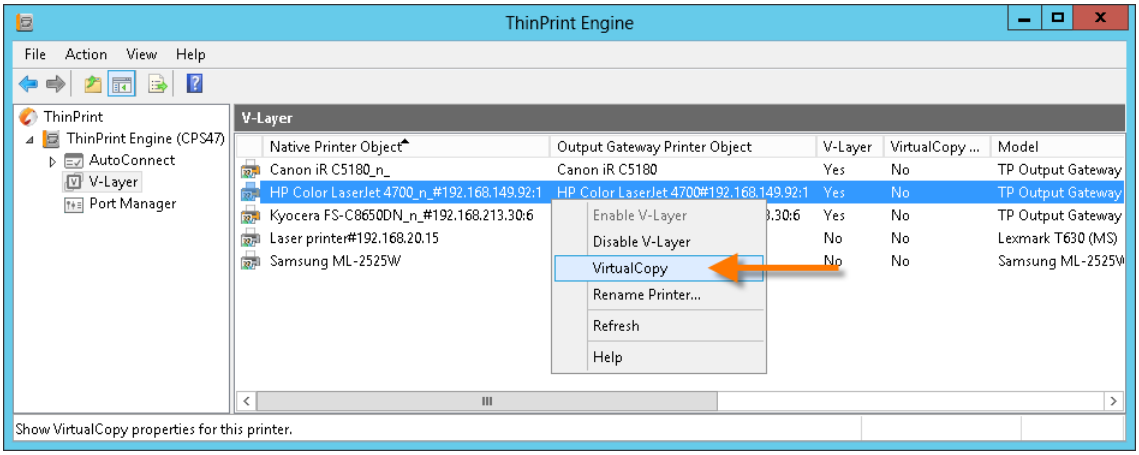
Illus. 57 V-Layer printer pairs: The first printer of a pair uses the TP Output Gateway and the second one uses the native driver (example)

Please note that the following Output Gateway features cannot be used with V-Layer: OPEN MY PRINTING PREFERENCES and PRINT PREVIEW (Illus. 49) as well as the compression level settings (Illus. 46). That way, the compression used by ThinPrint Ports and ThinShare is not affected.

VirtualCopy

With VirtualCopy, documents can be printed to up to five printers (and/or locations) simultaneously. As an administrator you can provide users with the corresponding printer object.

– Select a printer with V-Layer already enabled. Then open the context menu and select VIRTUALCOPY (Illus. 58).



Illus. 58 Select VirtualCopy

– Now you can choose up to four more printers to which print jobs are automatically sent, when this V-Layer is selected. Then click OK (Illus. 59).

Note: You can also find the VirtualCopy option in the settings of Output Gateway objects (of V-Layers), either in the printers folder or in Print Management.

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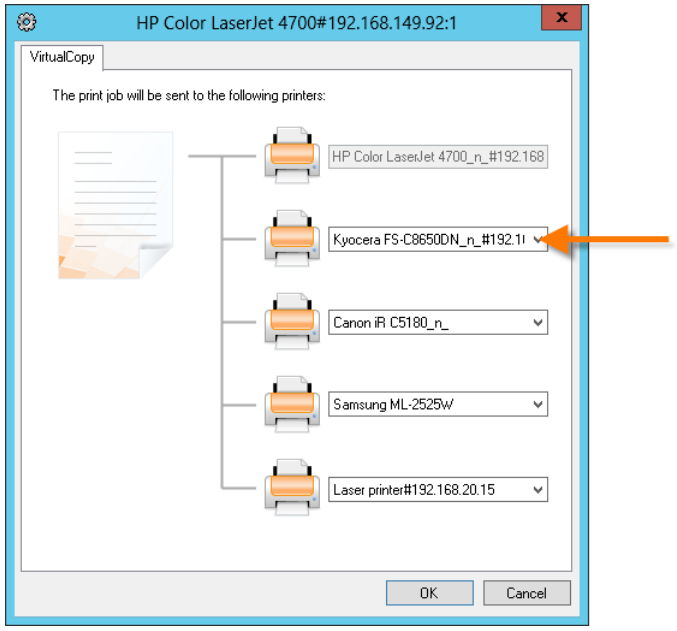

Illus. 59 VirtualCopy: Add more printers

If this printer (in the example: `HP Color LaserJet 4700`) is selected by the users in a desktop session (e.g. on a terminal server), then the printout occurs on all pre-installed printers simultaneously. The users cannot make any changes to this selection. Only in the printers folder under printer properties can they see which printers were preset by the Administrator.

Encryption of print data

As well as being able to encrypt communications to the Cortado server (see Page 92), you can also send print data from ThinPrint Engine via ThinPrint Ports with SSL encryption. This ensures a secure connection between ThinPrint Engine and ThinPrint Client. Using SSL encryption requires that the following types of certificates be imported:

- one “personal” server certificate and one root certificate on each server with ThinPrint Engine
- one “personal” client certificate on each client to which encrypted print data are to be sent

SSL certificates can be ordered at a certification authority, or you can create them yourself (see the technical description *Creating SSL certificates for printing with ThinPrint*).

Using the **root certificate** the ThinPrint Engine checks the certificates received from the clients. It checks whether the respective client is authorized to receive print data. SSL/TLS encryption is also available for use with the Connection Service.

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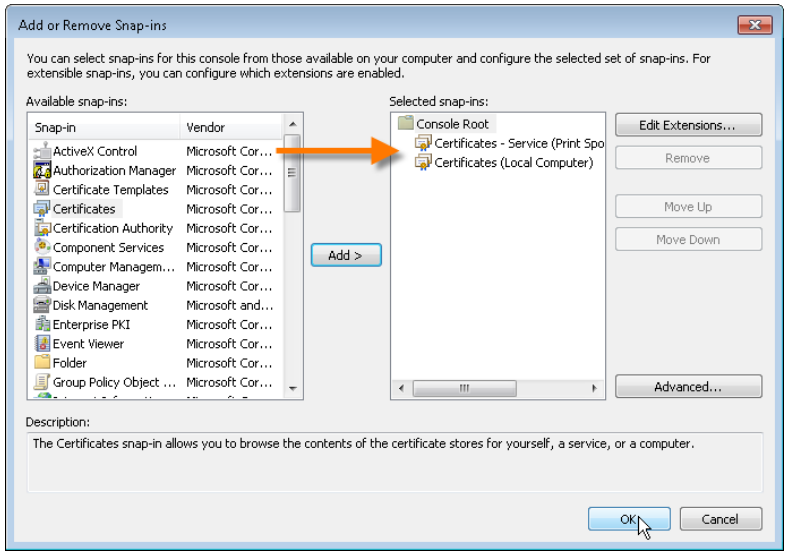
Importing SSL certificates onto the servers

Install your SSL certificates onto the servers as follows:

1. Log on as a member of the ADMINISTRATORS group and open the Microsoft Management Console from the command prompt with:

   ```
   mmc
   ```

2. In the MMC, select:
   FILE⟶ ADD/REMOVE SNAP-IN⟶ CERTIFICATES⟶ ADD⟶ SERVICE ACCOUNT⟶ NEXT⟶ LOCAL COMPUTER⟶ NEXT⟶ PRINT SPOOLER⟶ FINISH
3. Next select:
   ADD⟶ COMPUTER ACCOUNT⟶ NEXT⟶ LOCAL COMPUTER⟶ FINISH⟶ CLOSE
4. Lastly, click OK (Illus. 60).



Illus. 60 Adding snap-ins for SSL certificates to the MMC

5. Import the certificate(s) to the two locations shown in Illus. 61 (see arrows). For each location, select ALL TASKS⟶ IMPORT in the context menu and then NEXT⟶ BROWSE⟶ OPEN⟶ NEXT⟶ (PASSWORD⟶ NEXT)[15]⟶ PLACE ALL CERTIFICATES IN THE FOLLOWING STORE⟶ NEXT⟶ FINISH⟶ OK. The branch CERTIFICATES will be created automatically, if required.
   The “personal” server certificate will be imported under CERTIFICATES – SERVICE (PRINT SPOOLER) ON LOCAL COMPUTER⟶ SPOOLER\PERSONAL and the root certificate under CERTIFICATES (LOCAL COMPUTER)⟶ TRUSTED ROOT CERTIFICATION AUTHORITIES.

15 Please note that the server certificate is a password-protected .pfx file with a private key. For the root certificate however, a .cer file (without a key or password) must be imported.

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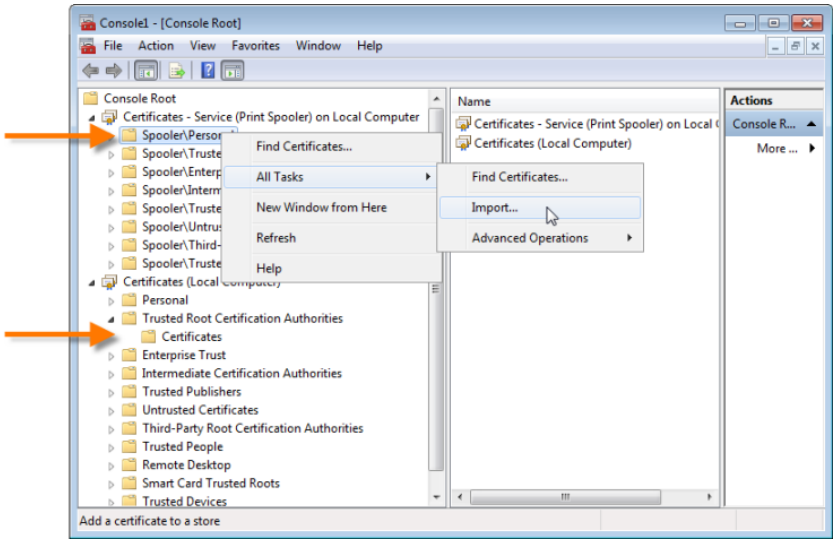
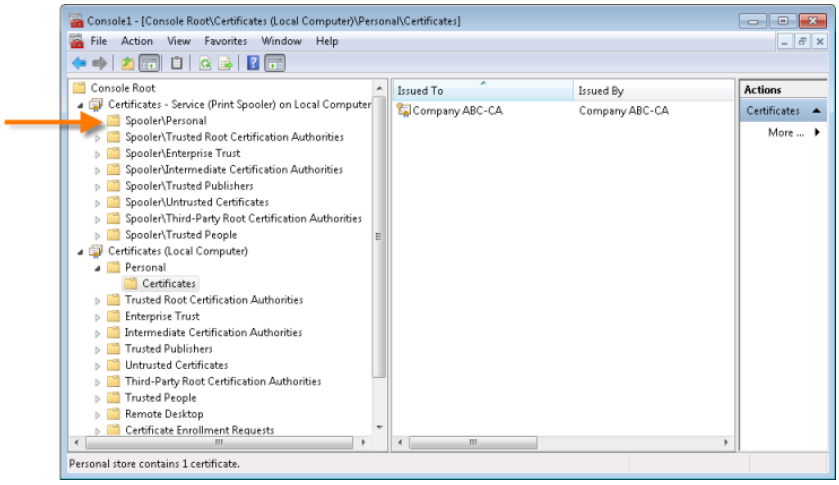
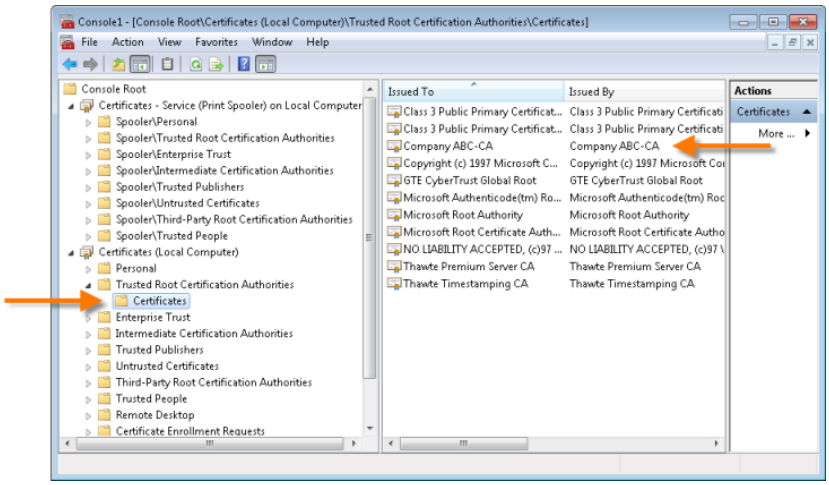


Illus. 61 Importing two SSL certificates onto the server

Two examples for imported certificates can be found in Illus. 62 and 63.



Illus. 62 First SSL certificate imported onto the server (example for server certificate)



Illus. 63 Second SSL certificate imported onto the server (example for root certificate)

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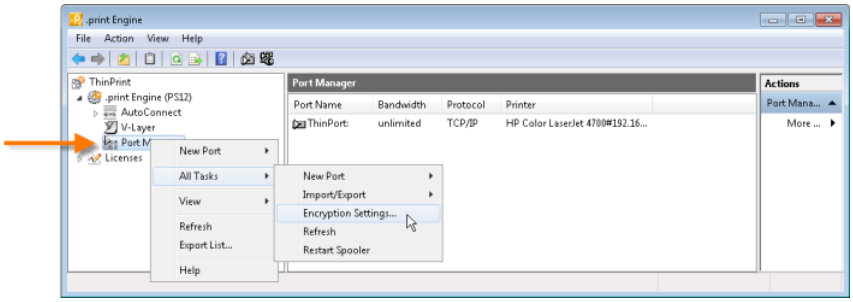
Selecting certificates

6. To use the imported SSL certificates with the ThinPrint Engine, open the ThinPrint Port configuration.
7. Select ENCRYPTION SETTINGS in the PORT MANAGER context menu (Illus. 64).



Illus. 64 Selecting ENCRYPTION SETTINGS

8. Enter the names of server and root certificates under ENCRYPTION CERTIFICATES (Illus. 65). Use the names that are displayed in the column ISSUED TO in the MMC's certificate overview (in Illus. 62 and Illus. 63 `Company ABC` and `Company ABC-CA` as examples).

Illus. 65 Selecting imported SSL certificates (example)

9. Fill in both fields and check that each certificate is installed on the server (see Page 56) and that the certificates installed on the clients are trusted by the server certificates (see below). Otherwise, print jobs will not be executed.

Enabling encryption

SSL encryption is enabled per ThinPrint Port – either in the ThinPrint Engine configuration console (Illus. 66) or using Management Center[16] or Management Services[17].

16 http://download.cortado.com/docu/ThinPrint/MC/en/2.2/

17 http://download.cortado.com/docu/ThinPrint/Tpms/en/1.0/

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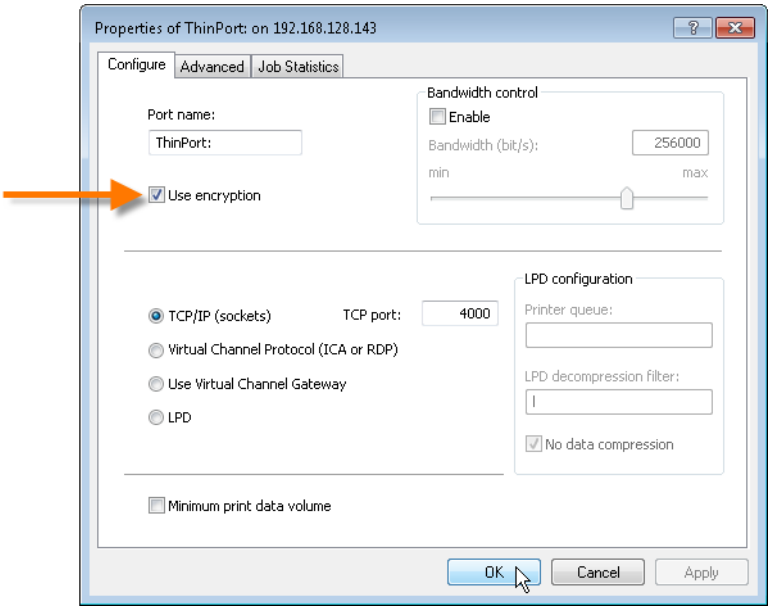

Illus. 66 Enabling encryption in the ThinPrint Port configuration

Note! When using Microsoft Cluster Services (Windows Server 2008 R2 only), perform all port settings on the cluster instance (Illus. 65 and 66). The server-side certificates, however, must be installed individually on each cluster node; for a description see the paper *Microsoft Failover Clusters and ThinPrint*.

Importing SSL certificates onto the clients

For client-side installation of SSL certificates, please consult the relevant ThinPrint Client manual. In the following, the installation is described using the example of the ThinPrint Client Windows.

1. To install a client certificate, select the following in the MMC on the workstation: File⟶ Add/Remove Snap-In⟶ Certificates⟶ Add⟶ Computer account[18]⟶ Local computer⟶ Finish⟶ OK
2. Now import the certificate by selecting All Tasks⟶ Import in the context menu (Illus. 67) and then
   Next⟶ Browse⟶ Open⟶ Next⟶ Password⟶ Next⟶ Place all certificates in the following store⟶ Next⟶ Finish⟶ OK

18 If only one person uses the machine, add instead My user account at this point. Via Current User⟶ Personal, import the certificate into the user's store. The client certificate is thereby linked to the current user.

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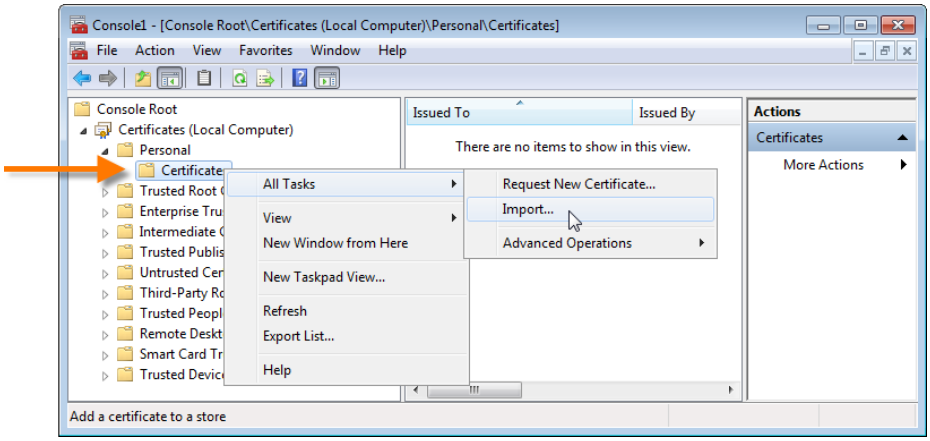
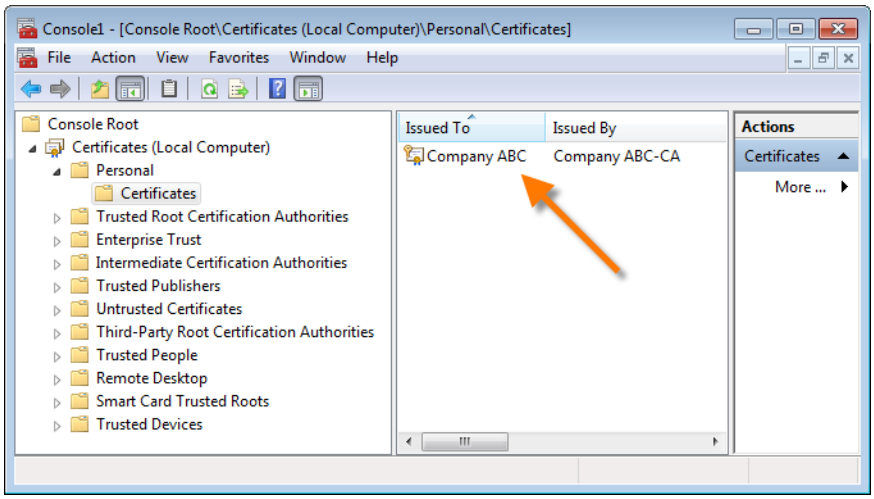


Illus. 67 Starting import of an SSL certificate on a client machine

The result is shown in Illus. 68.



Illus. 68 SSL certificate imported onto a client machine

Registry entry CertName

Before sending encrypted print data, the server checks whether the name of the imported certificate is included in the `CertName` entry in the client computer's Windows registry and whether the stored certificate is present on the client. The `CertName` entry in the registry must be entered manually as follows:

1. After the certificate has been imported, create the following registry value on the client machines with REGEDIT (Illus. 69; data type: REG_SZ):

   `hkey_local_machine\software\thinprint\client\CertName`

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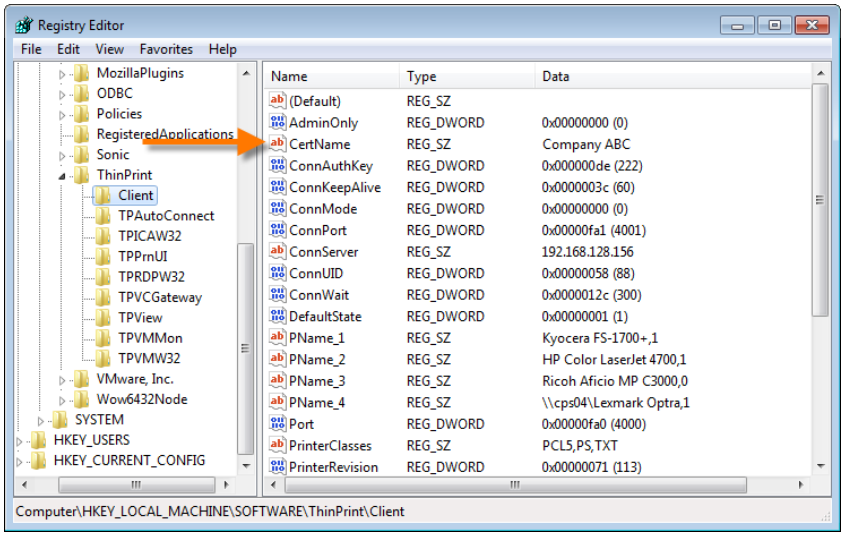

Illus. 69 Registry entry for SSL encryption on Windows clients (example for `Company ABC` certificate)

2. Enter as value the name of the imported certificate as displayed in the column ISSUED TO of the MMC's certificate overview (`Company ABC` as example in Illus. 68 and 69).
3. Restart ThinPrint Client Windows (application or Windows service).

The `CertName` registry entry is only needed for encrypting print data; receipt of unencrypted print data is still possible.

AutoConnect

Introduction

With AutoConnect it's possible to **map printer objects automatically** if shared printers can be used on a central, dedicated print server (Illus. 70). AutoConnect is installed as a Windows service, and is supplied with the ThinPrint Engine package, i.e. Terminal Server Extension and Desktop Extension.

AutoConnect features

- Dynamic connection to shares on central print servers (= printer mapping), based on various criteria, e.g.:
  - Active Directory user or group name
  - Printer name
  - Client (or host) name
  - Client IP address
- Two methods for AutoConnect configuration:
  - Using an MMC snap-in (recommended for single terminal servers)
  - Using a Group Policy Object (recommended for large environments)
- Support for Output Gateway
- Support for Virtual Channel Gateway

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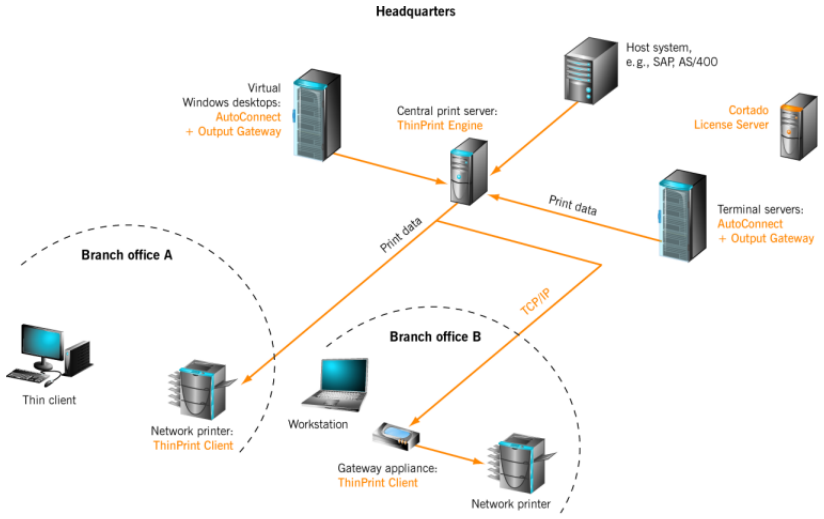
- Support for Connection Service
- Support for Management Center
- Support for Management Services



Illus. 70 AutoConnect – configuration with central print server

Basic configuration

- ThinPrint Engine on a central print server
- AutoConnect, Virtual Channel Gateway and Output Gateway on the machine on which the applications run: terminal servers, workstations or virtual desktops
- ThinPrint Clients on workstations and/or local print servers and/or gateway appliances

Where and how to install AutoConnect?

AutoConnect is installed on the same computers on which the applications run. When using VMware Horizon View the AutoConnect installer is not required because AutoConnect is embedded in the View Agent. To update AutoConnect on VMware Horizon View desktops, and in other desktop environments use the Desktop Extension installation routine.

Alternatively, AutoConnect and Output Gateway can also be installed on workstations – again, using the Desktop Extension installer.

AutoConnect configuration using group policies

AutoConnect is already installed on virtual desktops running VMware Horizon View[19]. To manage AutoConnect for all desktops, you can configure it in group policies. When a user logs on, AutoConnect settings are sent dynamically to the user's desktop[20]. In a session, AutoConnect automatically connects the print server's shared printers, as specified in Dynamic Printer Matrix and/or Map Additional Printers. Group policies can be configured on any computer which is a domain member – local

19 On the condition that View Agent, including Virtual Printing option, is installed

20 i.e., a virtual desktop, a workstation, or a terminal server

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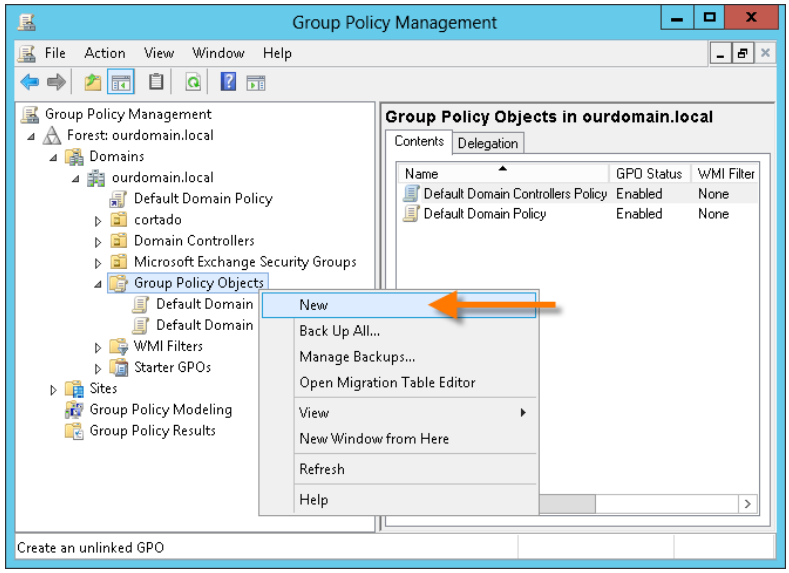
or remote. We recommend configuring them directly on the domain controller (active directory server). That process is described here.

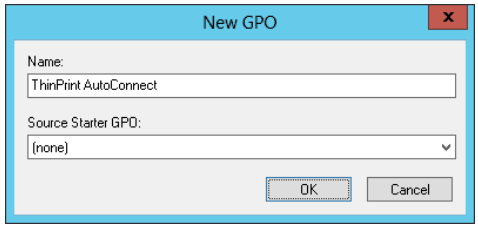
Installing AutoConnect tables as a group policy

1. Copy **GPO AutoConnect** installer **Setup.exe** (provided with ThinPrint Engine) onto the machine on which you wish to edit your group policies. Here, the domain controller is used. Run the installer.
2. Open the Group Policy Management. This is part of Windows Server 2008 or later. For Windows Server 2003, you need to install the service GPMC.MSI which can be downloaded from the Microsoft website (a free download).



Illus. 71 Create new group policy

3. Create a new group policy: Select NEW in the Context Menu under GROUP POLICY OBJECTS (Illus. 71) and choose a name (Illus. 72).



Illus. 72 New AutoConnect group policy

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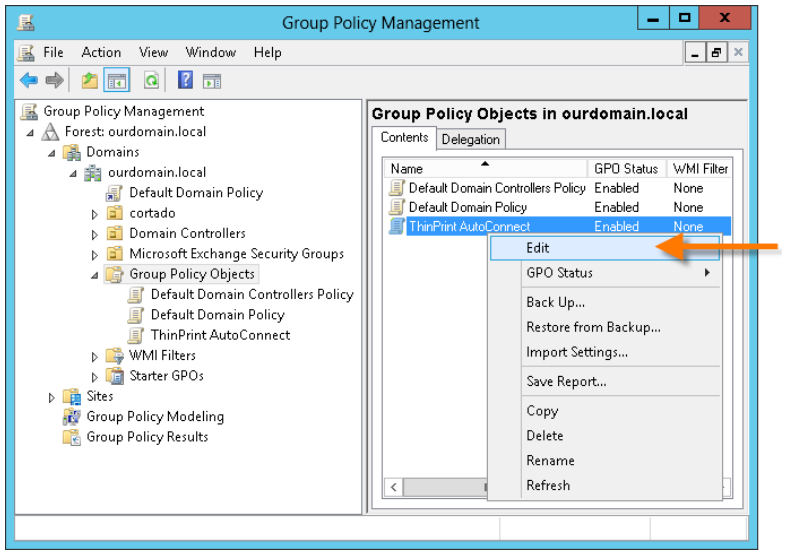
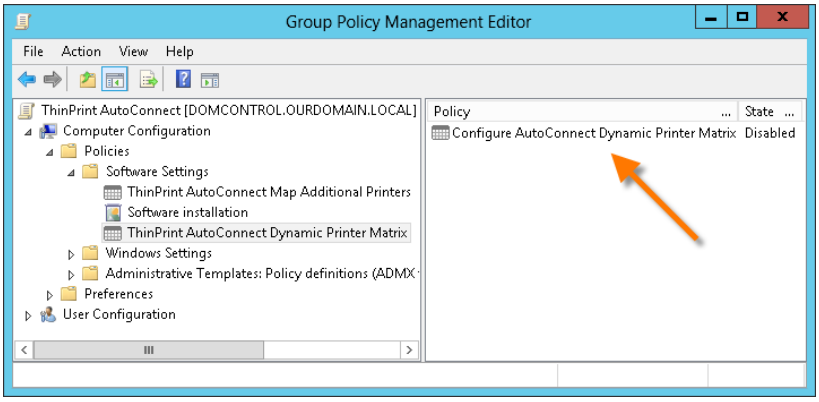
4. Select EDIT to configure the new AutoConnect group policy (Illus. 73). The GROUP POLICY OBJECT EDITOR will open.



Illus. 73 Configure new AutoConnect group policy

5. **Dynamic Printer Matrix:** Double-click CONFIGURE AUTOCONNECT DYNAMIC PRINTER MATRIX to edit this group policy (Illus. 74).
6. **Map Additional Printers:** Double-click CONFIGURE AUTOCONNECT MAP ADDITIONAL PRINTERS to edit this group policy (Illus. 75).



Illus. 74 Open group policy editor for Dynamic Printer Matrix

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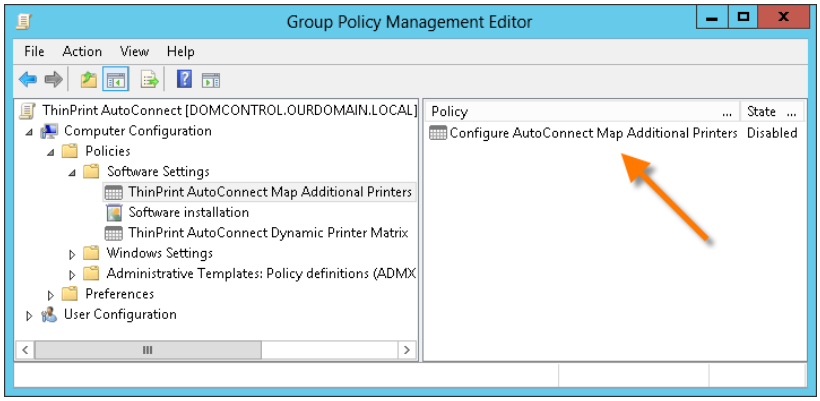
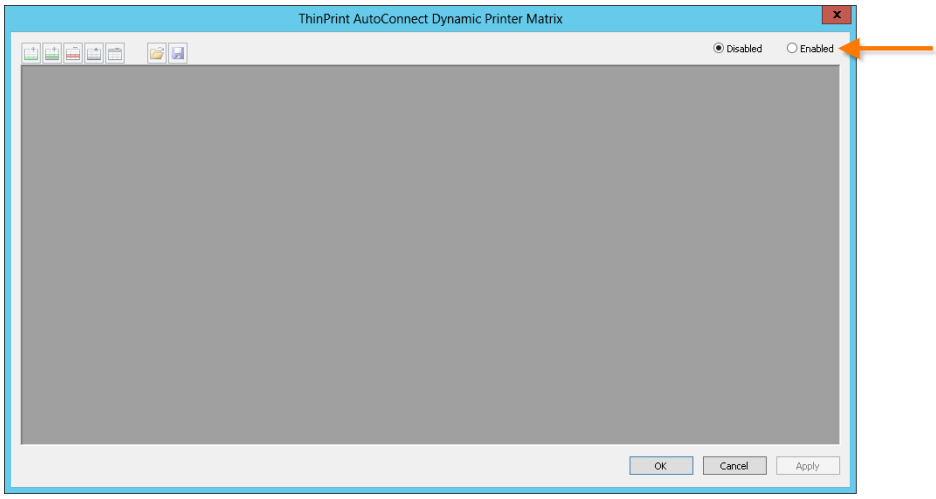
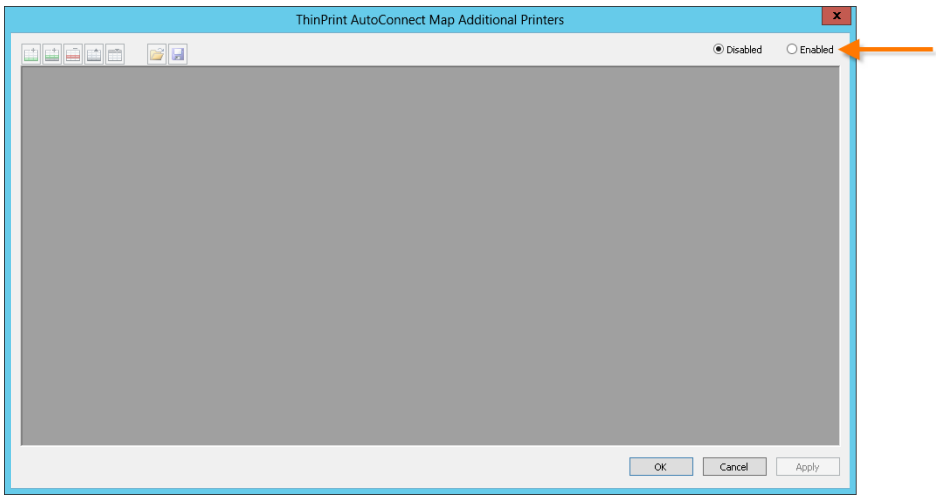


Illus. 75 Open group policy editor for Map Additional Printers

7. The respective table opens and is at first disabled. Select ENABLE in the upper right hand corner (Illus. 76 and 77).



Illus. 76 Enable Dynamic Printer Matrix



Illus. 77 Enable Map Additional Printers

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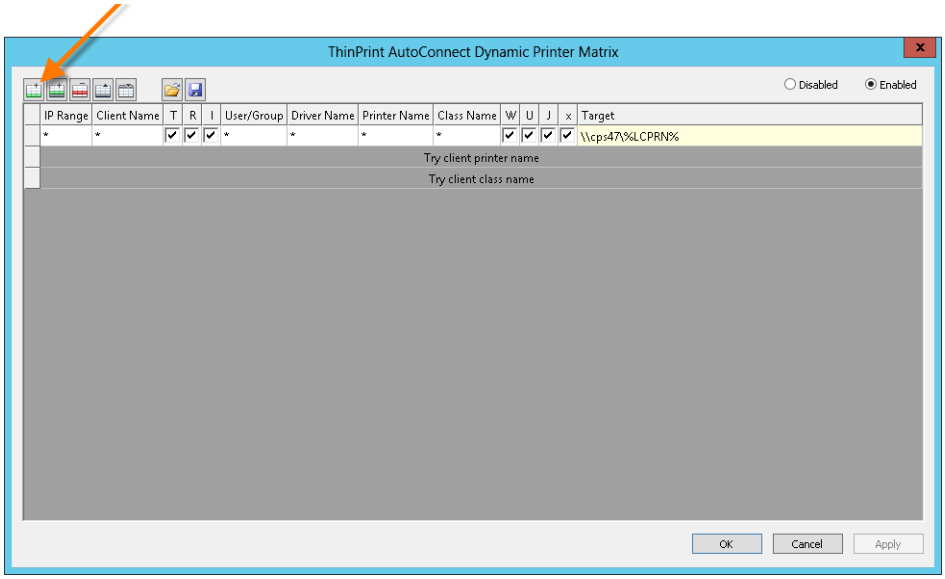
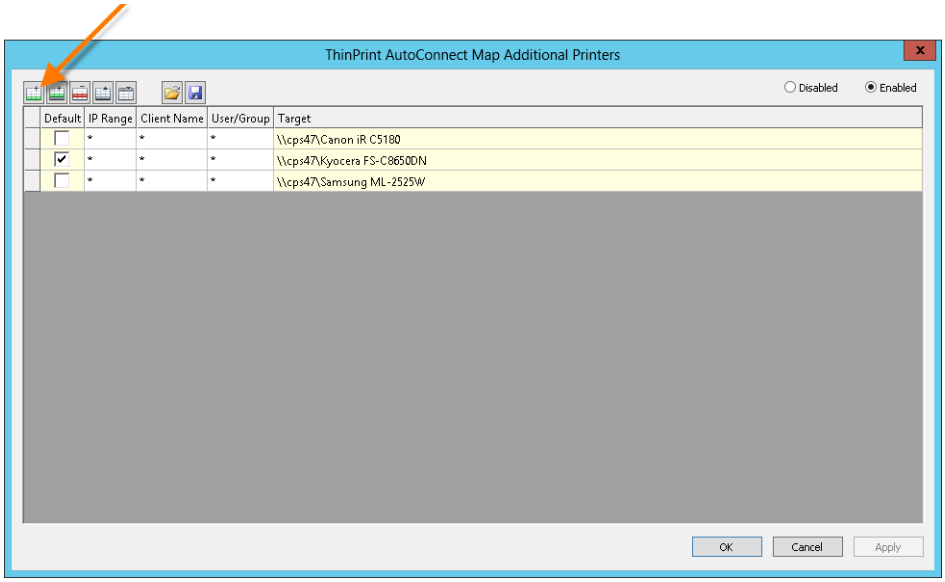
Configuring AutoConnect

AutoConnect searches for an entry in Dynamic Printer Matrix for each printer activated in the respective ThinPrint Client – but not in Map Additional Printers. When the first entry in the table fits, a printer is mapped into the session. This printer prints to the printer specified under TARGET.

Click on the first icon on the top, left, to insert a new line (arrow in Illus. 78 and 79).



Illus. 78 Dynamic Printer Matrix with a variable



Illus. 79 Map Additional Printers with three printer shares and a default printer

For **Dynamic Printer Matrix only**: To map all printers of all ThinPrint Clients Windows, just make one single entry under TARGET:

```
\\cps47\%LCPRN%
```

Example:

```
\\192.168.149.80\%LCPRN%
```

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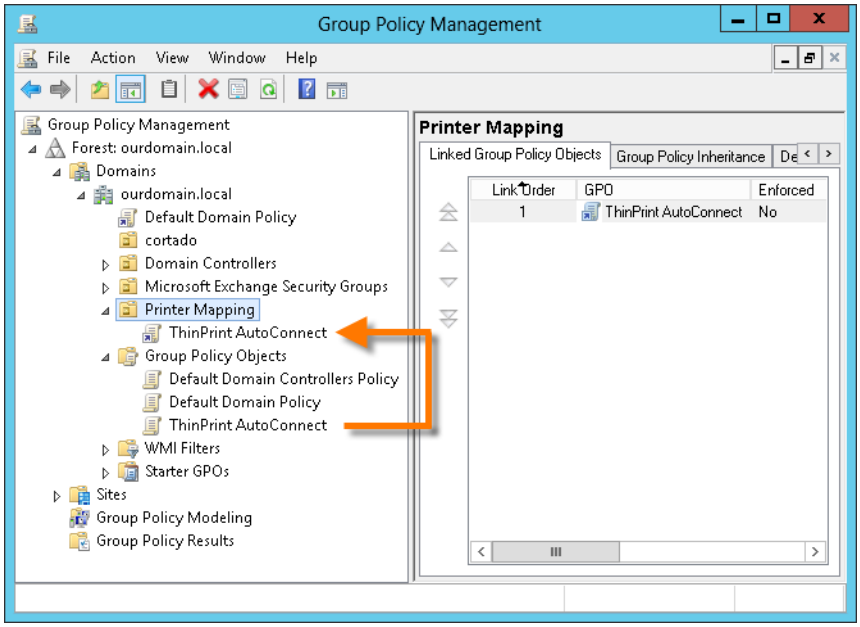
printserver is the name of the central print server, the variable %LCPRN% stands for *Local Client Printer*, the name of the client printer (Illus. 92).

You can create one or more group policies for AutoConnect. The policy created here could be used for all branch offices and can therefore be linked with different Organizational Units (OUs).

Caution! Using the DISABLED button at top right deletes all AutoConnect entries. As a precaution, save your configuration, so you can import it later, if necessary (see Page 83)

Organizational Units in the Active Directory

– Link the group policy here with the OU of your choice (Illus. 80). In this example, it is linked to the OU PRINTER MAPPING.



Illus. 80 Link group policy to an OU

– To activate the Group Policies **restart the respective sessions** or run `gpupdate /force` on them.

Note that the AutoConnect OUs are **computer specific**, and not user specific. Therefore the computers must be located under ACTIVE DIRECTORY - USERS AND COMPUTERS in their respective OUs (Illus. 81).

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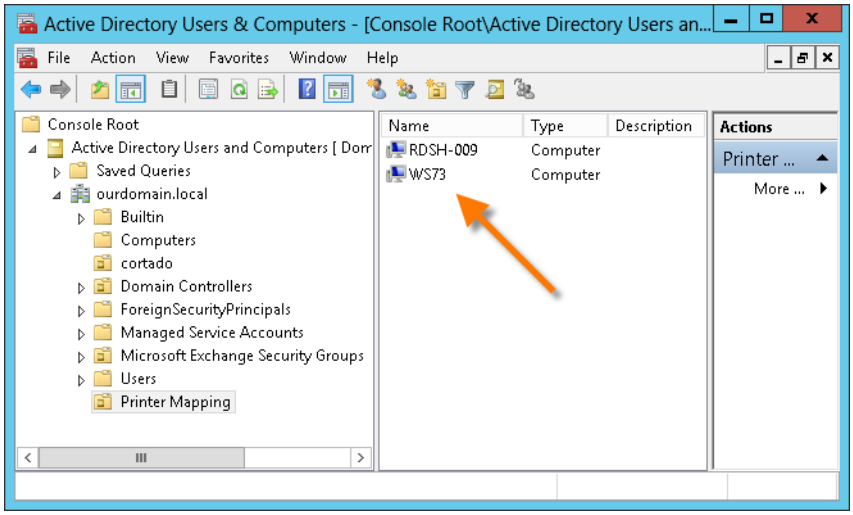

Illus. 81 Computers in the OU *Printer Mapping* (example)

AutoConnect settings can be found in Group Policy Object Editor under COMPUTER CONFIGURATION⟶ SOFTWARE SETTINGS.

Note! Updating **group policies** can take some time. You can speed up the process with the following entry in the command line: `gpupdate /force` (space after gpupdate).

AutoConnect configuration using the MMC

The description below is recommended for configuring AutoConnect for single terminal servers. The AutoConnect configuration using group policies is described on Page 62.

You can configure AutoConnect locally as well as remotely; for remote configuration AutoConnect must be installed on both machines.

1. Open the ThinPrint configuration.

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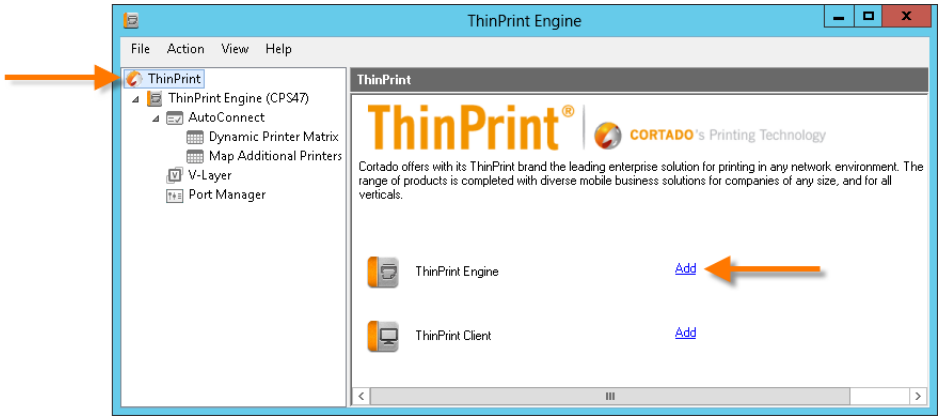
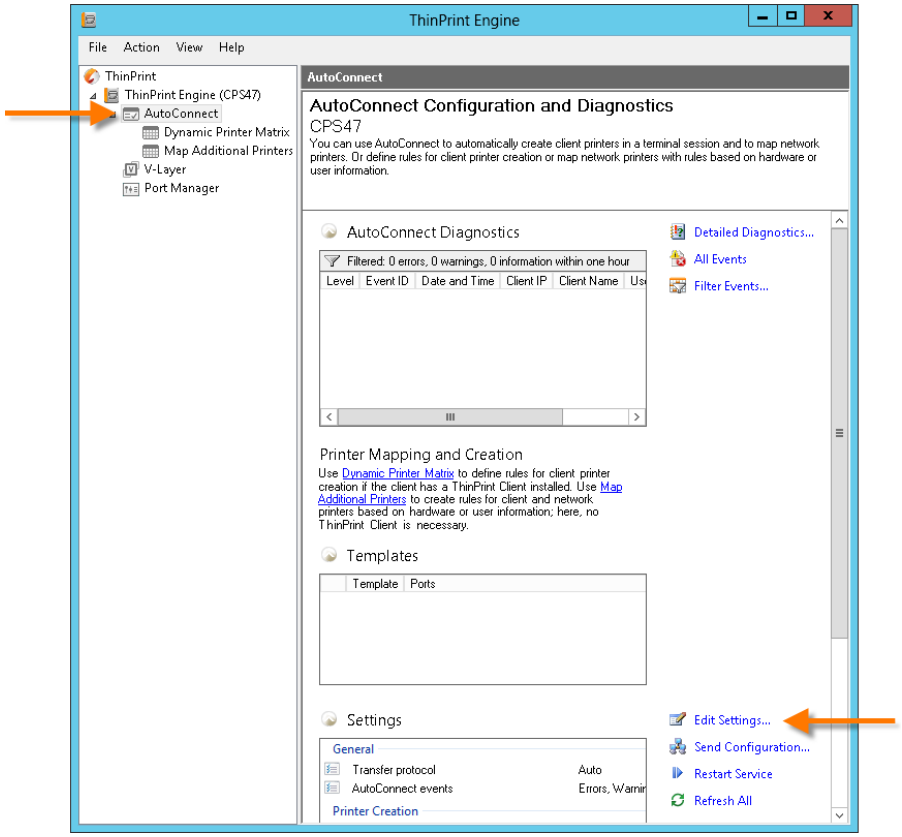
2. In case of remote configuration: In the THINPRINT node, click ADD (Illus. 82) and then specify the computer address for each remote ThinPrint Engine to be configured.



Illus. 82 Open the configuration console for ThinPrint Engine

3. The ThinPrint Engine console appears (Illus. 83). Select on the left, i.e., in the Console Tree: THINPRINT⟶ THINPRINT ENGINE⟶ AUTOCONNECT.


ThinPrint Engine
File Action View Help
ThinPrint
ThinPrint Engine (CPS47)
AutoConnect
Dynamic Printer Matrix
Map Additional Printers
V-Layer
Port Manager
AutoConnect
AutoConnect Configuration and Diagnostics
CPS47
You can use AutoConnect to automatically create client printers in a terminal session and to map network printers. Or define rules for client printer creation or map network printers with rules based on hardware or user information.
AutoConnect Diagnostics
Filtered: 0 errors, 0 warnings, 0 information within one hour
Level Event ID Date and Time Client IP Client Name
Detailed Diagnostics...
All Events
Filter Events...
Printer Mapping and Creation
Use Dynamic Printer Matrix to define rules for client printer creation if the client has a ThinPrint Client installed. Use Map Additional Printers to create rules for client and network printers based on hardware or user information; here, no ThinPrint Client is necessary.
Templates
Template Ports
Settings
General
Transfer protocol
Auto
AutoConnect events
Printer Creation
Edit Settings...
Send Configuration...
Restart Service
Refresh All

Illus. 83 Open AutoConnect configuration

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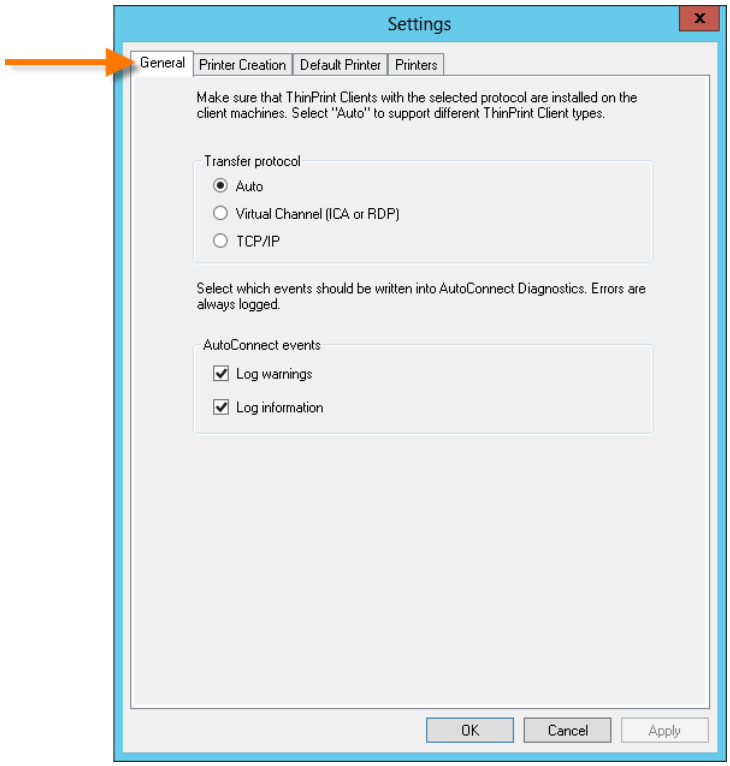
Configuration

– Clicking on EDIT SETTINGS (Illus. 83) will open the AutoConnect configuration (Illus. 84).



Illus. 84 AutoConnect configuration: GENERAL tab

Settings

General

In the **GENERAL tab** (Illus. 84) the default value for the connection protocol between AutoConnect and ThinPrint Clients can be selected. If you select TCP/IP or VIRTUAL CHANNEL (ICA OR RDP), you restrict the communication to a protocol family. The AUTO setting allows both protocol families and is therefore recommended for ICA/RDP as well as TCP/IP ThinPrint Ports. In Dynamic Printer Matrix (see below) you can limit this setting per rule; here, the columns T, R and I correspond to the protocols TCP/IP, ICA and RDP.

Furthermore, you can decide here which AutoConnect events are to be logged and displayed in the AUTOCONNECT DIAGNOSTICS table (Illus. 83).

Printer Creation

In the **PRINTER CREATION tab** (Illus. 85) you can determine when the printers are to be created or mapped:

- Either at each session logoff/logon
- Or when disconnecting and reconnecting a session.

Restart the TP AUTOCONNECT SERVICE afterwards.

In case you use only the Map Additional Printers table for connecting printer shares you can speed up AutoConnect using the option DISABLE DYNAMIC PRINTER MATRIX.

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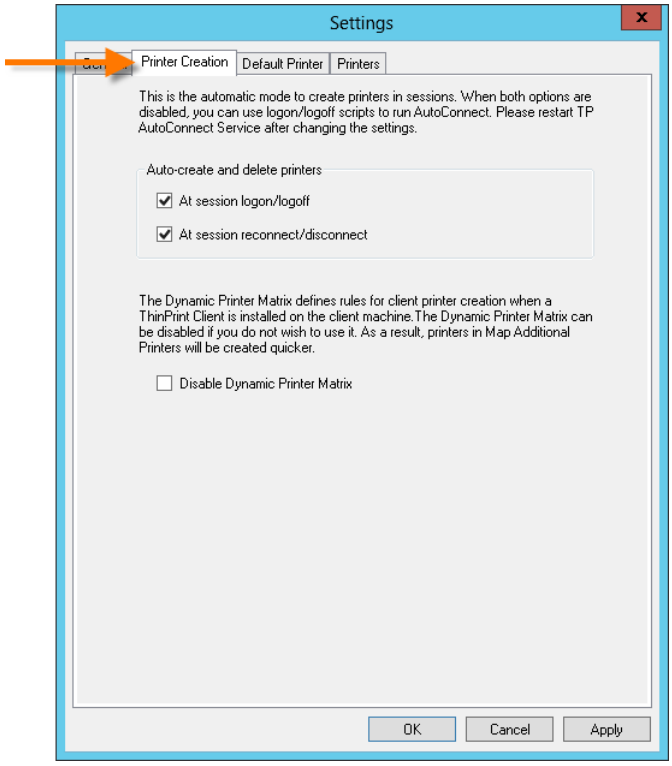
Settings
Printer Creation
Default Printer
Printers
This is the automatic mode to create printers in sessions. When both options are disabled, you can use logon/logoff scripts to run AutoConnect. Please restart TP AutoConnect Service after changing the settings.
Auto-create and delete printers
At session logon/logoff
At session reconnect/disconnect
The Dynamic Printer Matrix defines rules for client printer creation when a ThinPrint Client is installed on the client machine. The Dynamic Printer Matrix can be disabled if you do not wish to use it. As a result, printers in Map Additional Printers will be created quicker.
Disable Dynamic Printer Matrix
OK
Cancel
Apply

Illus. 85 AutoConnect configuration: PRINTER CREATION tab

Default Printer

Using the settings in the **DEFAULT PRINTER tab** (Illus. 86) you can set ***whether*** the session's default printer should be changed and – if yes – which information is to be used to change it:

- either the CURRENT PRINTER of the relevant THINPRINT CLIENT (in case of using Dynamic Printer Matrix)
- or the DEFAULT column of MAP ADDITIONAL PRINTER (Illus. 103)
- or the last CHOICE by the users in the session

Printers

The settings in the **PRINTERS tab** (Illus. 87) can only be used if printers are created using templates. This is described in the manual *ThinPrint Engine on terminal servers*.

For transfer of printer properties from ThinPrint Clients to Output Gateway objects on print servers, Management Center or Management Services can be used instead.

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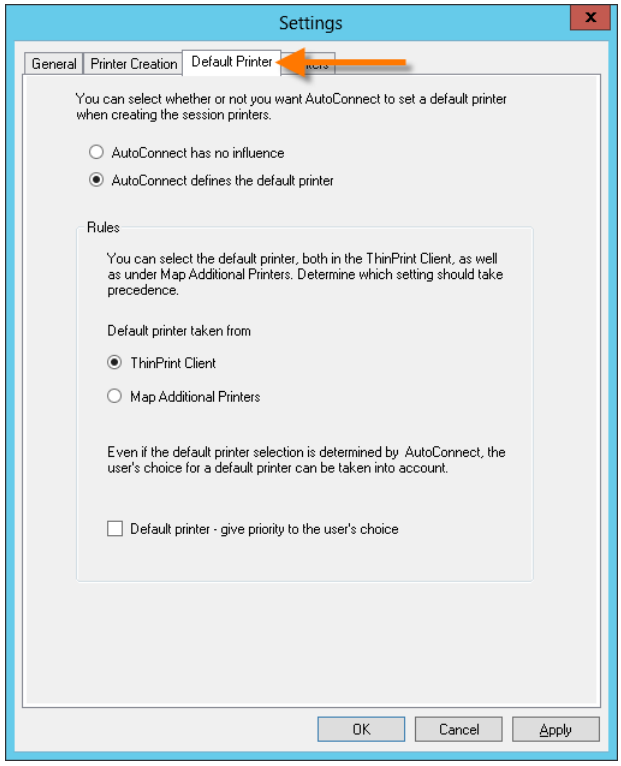
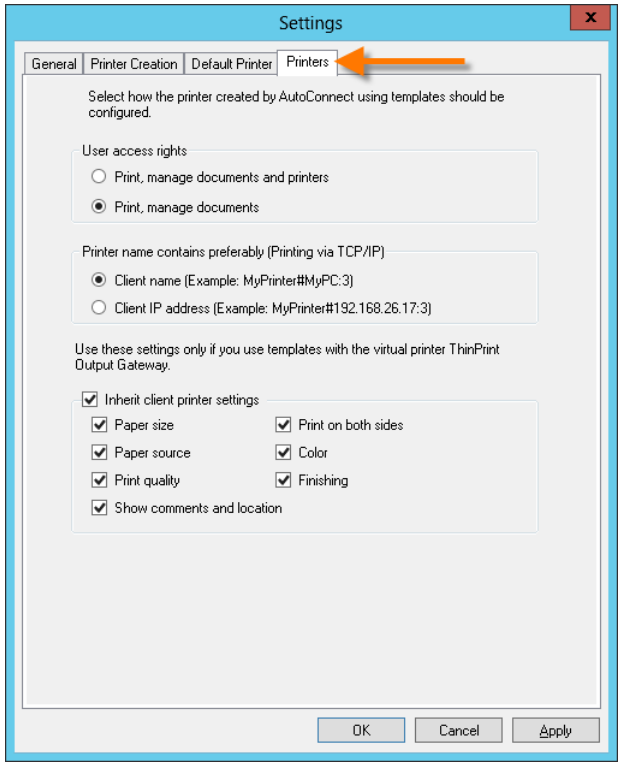

Settings
General
Printer Creation
Default Printer
You can select whether or not you want AutoConnect to set a default printer when creating the session printers.
AutoConnect has no influence
AutoConnect defines the default printer
Rules
You can select the default printer, both in the ThinPrint Client, as well as under Map Additional Printers. Determine which setting should take precedence.
Default printer taken from
ThinPrint Client
Map Additional Printers
Even if the default printer selection is determined by AutoConnect, the user's choice for a default printer can be taken into account.
Default printer - give priority to the user's choice
OK
Cancel
Apply

Illus. 86 AutoConnect configuration: DEFAULT PRINTER tab



Illus. 87 AutoConnect configuration: PRINTERS tab

Dynamic Printer Matrix

The Dynamic Printer Matrix lets AutoConnect map the printer shares created on the central, dedicated print servers to the desktop sessions. You can precisely control

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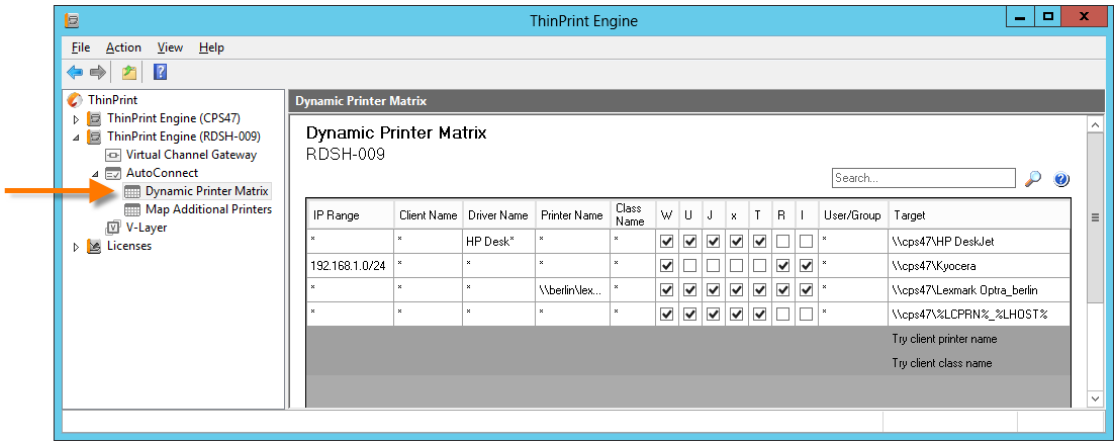
which user is to get what printer. This table requires a ThinPrint Client on the user's workstation or terminal as well as a ThinPrint Engine on the print server(s). For all other shares, use the Map Additional Printers (Page 82).

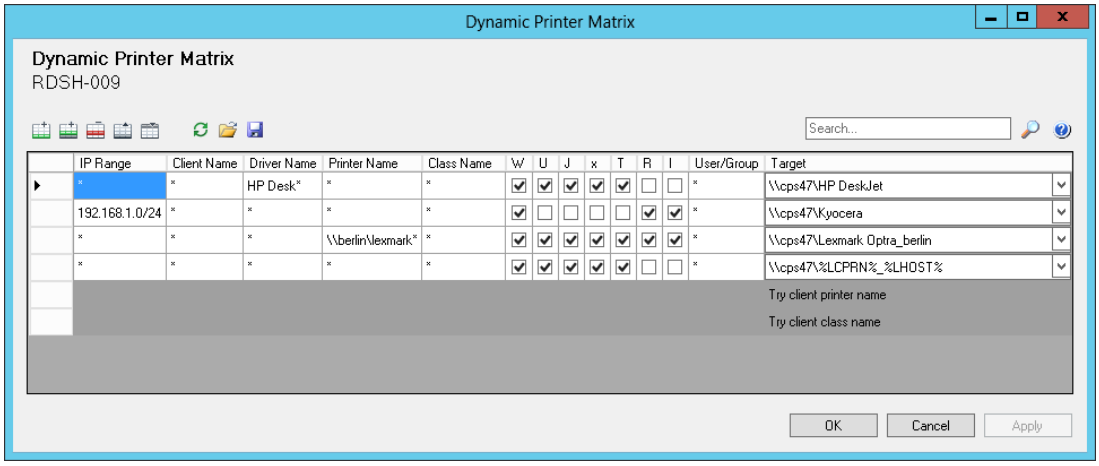
– Select Dynamic Printer Matrix in the console tree (Illus. 88)



Illus. 88 Dynamic Printer Matrix in the ThinPrint Engine configuration

Configuration

Double-clicking in the table (Illus. 88) will open the Dynamic Printer Matrix configuration console (Illus. 89). Use the buttons (top left) to edit the table.



Illus. 89 Editing Dynamic Printer Matrix

Table functions

You have the option of hiding unneeded columns (Illus. 90). In all cases, hidden columns (and their rules) are deactivated.

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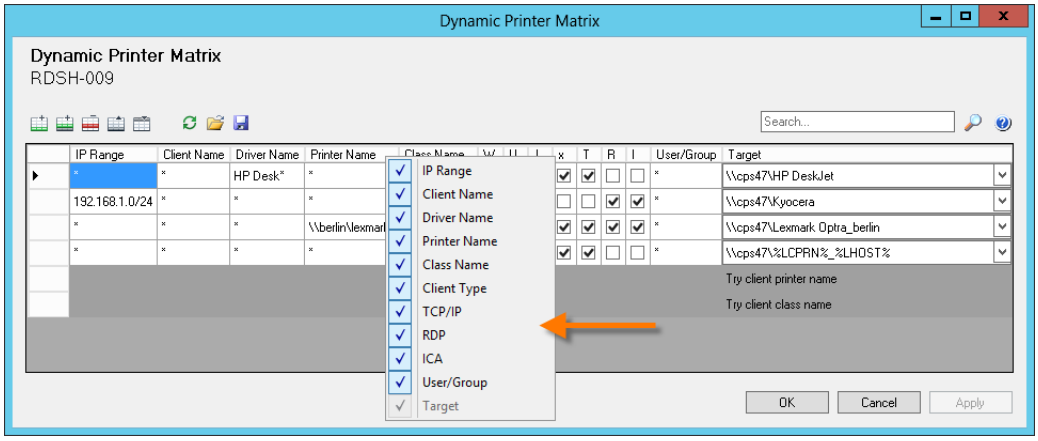
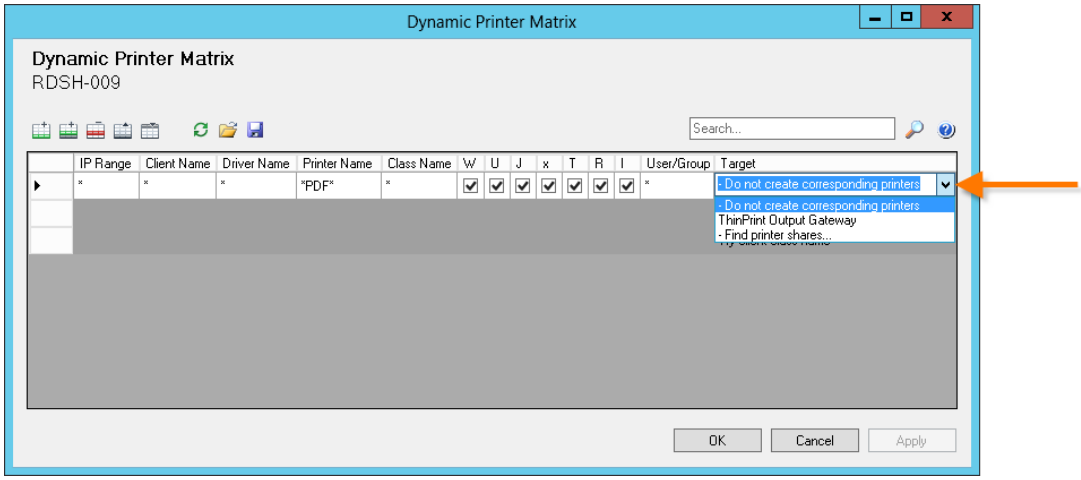


Illus. 90 Hiding columns

In the TARGET column you can either specify a UNC path to a shared printer or you can select one of the following options (Illus. 91):

- FIND PRINTER SHARES (prompts a search for printers listed in the Active Directory)
- DO NOT CREATE CORRESPONDING PRINTERS (excludes from mapping, all printer shares that match the given criteria – e.g. all PDF writers, see the entry *PDF* in the PRINTER NAME column in Illus. 91)



Illus. 91 Target column options

Functional principle

When AutoConnect is executed, it processes the table from top to bottom, for each printer activated in ThinPrint Client (Illus. 92). If all criteria (columns) in one line are met for the first printer AutoConnect searches for the share specified in the column TARGET and establishes a connection to this printer share during the session. AutoConnect now stops the search for this printer in the table and, if applicable, continues the same procedure for the next activated printer in ThinPrint Client etc. etc.

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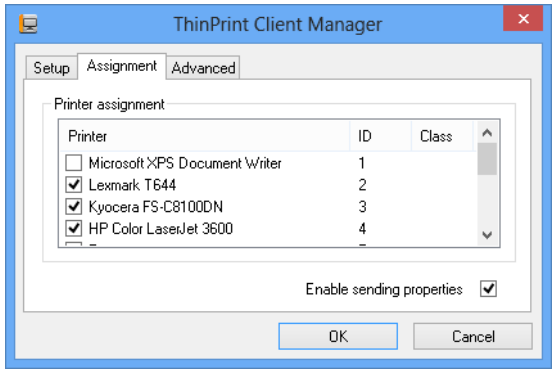

Illus. 92 Three printers activated in the ThinPrint Client Manager

You can change AutoConnect's processing sequence by using the arrow keys ( ) to switch the line order. You can also add or delete lines. (For the two gray lines refer to Page 77.) The table has the following columns/translation rules: IP RANGE, CLIENT NAME, DRIVER NAME, PRINTER NAME, CLASS NAME, CLIENT TYPE, protocol and USER/GROUP; here, * and ? can be used as wild cards. The TARGET column represents the shares on the central, dedicated print server(s).

These features are explained in the scenarios below; the scenarios can also be combined with each other.

IP range

The IP RANGE column in Dynamic Printer Matrix or Map Additional Printers table could contain, for example, the following entries:

192.168.1.136
192.168.1.1–192.168.1.150
192.168.1.0/24
192.168.128.0/22
192.0.0.0/8

A separate printer share is to be given as each target; printers with different properties will thus be mapped in the respective session.

The default entry in IP RANGE is: 0.0.0.0–255.255.255.255

The **24** represents the following subnet mask: 255.255.255.0; i.e., 3x8 = 24 set bits (22 is equivalent to 255.255.252.0; 16 is equivalent to 255.255.0.0; and 8 is equivalent to 255.0.0.0).

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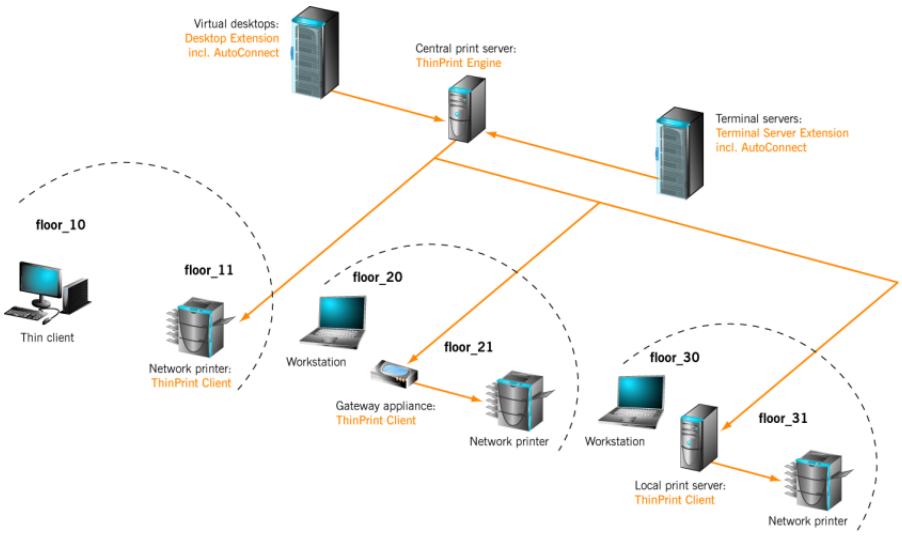
Scenario: Network printers in remote offices or office floors.



Illus. 93 Users should have their closest printers mapped when they open a session (ThinPrint components not shown here)

Each remote office (or floor) uses a different client name (both for workstations and for local, external and internal print servers). In this way, different printers on different workstations can be mapped using the client name (Illus. 93).

The CLIENT NAME and TARGET columns on Dynamic Printer Matrix or Map Additional Printers table could contain the following entries:

Client name	Target
floor_1*	\\cps47\floor_11
floor_2*	\\cps47\floor_21
floor_3*	\\cps47\floor_31

As an alternative to the CLIENT NAME column, you can also use the IP RANGE column. Only printer shares are entered in the TARGET column. (The default entry in CLIENT NAME and IP RANGE is: *)

Client type

On the one hand you can select between the client platforms Windows (**W**), Unix or Linux (**U**), Java (**J**) as well as Mac OS and other (**X**), and on the other hand between the connection protocols TCP/IP (**T**), RDP (**R**) and ICA (**I**); see also Page 70. By default, all client types are selected. If specific translation rules are only to apply to selected client types, they are easily selected by simply adding or removing a checkmark. In the following table, as an example, the ThinPrint Output Gateway share is

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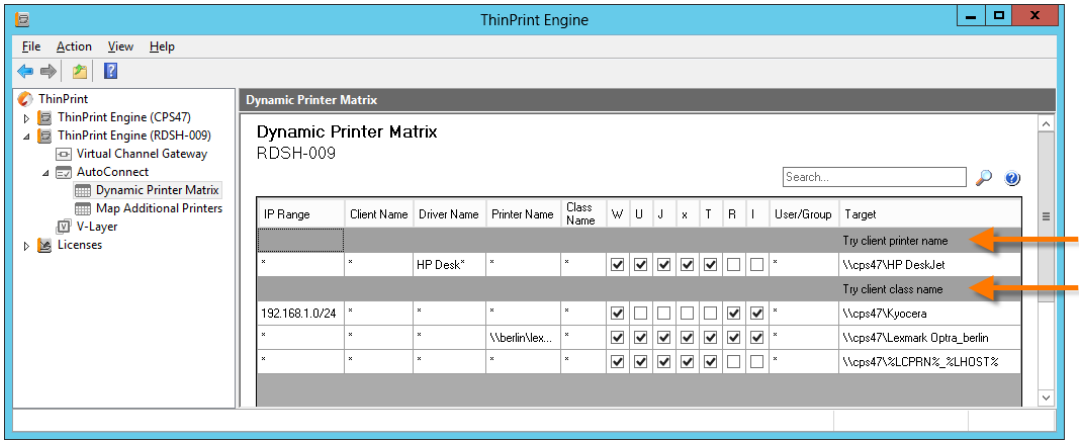
assigned to all Windows clients[21]. All other client types use the HPLaser share, which uses a native printer driver.

W	U	J	X	T	R	I	Target
√	–	–	–	√	√	√	\\cps47\ThinPrint Output Gateway
–	√	√	√	√	√	√	\\cps47\HPLaser

Try client printer name or client class name.
There are two special lines in Dynamic Printer Matrix (Illus. 94):

TRY CLIENT PRINTER NAME and
TRY CLIENT CLASS NAME

Special lines require that AutoConnect and ThinPrint Engine are running on the same computer. So these lines **cannot** be used for the mapping of printer shares on print servers. For more information see the *ThinPrint Engine on terminal servers* manual.



Illus. 94 Special lines

Variables

To simplify printer administration, it is possible to use variables. Several printers can thus be mapped with one single entry where the variables are replaced by e.g. the printer name or the print server name of the printer in the ThinPrint Client respectively.

21 Windows 95 or later

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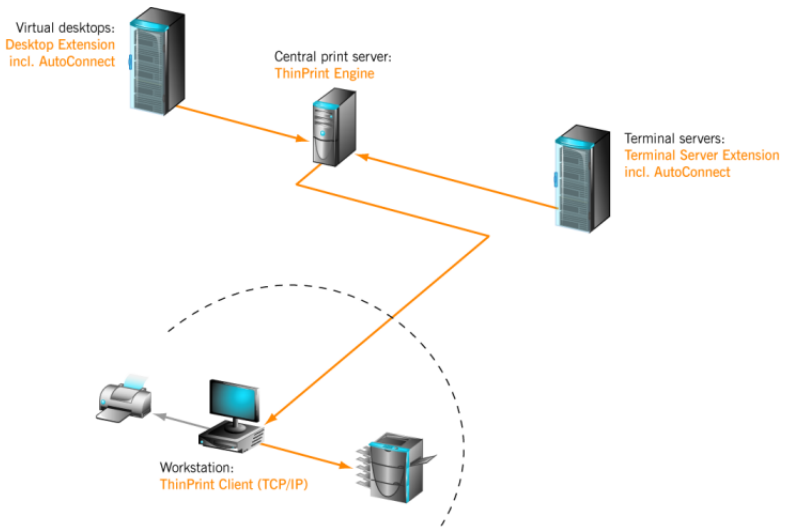
Variable	Meaning
%LCPRN% (Local Client Printer)	**Printer name** as shown in ThinPrint Client Manager (Illus. 92)
%LHOST% (Local Host Name)	Client machine's **host name** (= client name) (Page 104)
%LCLIP% (Local IP Address)	Client machine's **IP address**
%LPSRV% (Local Print Server)	**Local print server's name** as shown in ThinPrint Client Manager (e.g. *ps34* in Illus. 92)

The entries are made in the **TARGET column** in Dynamic Printer Matrix. Either variable can be used as desired, and they can also used in combination. (The share names the Management Center creates for printer objects on central print servers are compatible with these variables.) Further examples can be found on Page 100.

Below are two examples of how entries in the Dynamic Printer Matrix can be simplified by using variables.

Example without local print servers.
The main office has a terminal server or a VDI, plus a central print server with a ThinPrint Engine installed (Illus. 95). The goal is to map the printers of the respective workstation (or terminal) in each user's session with only one entry in Dynamic Printer Matrix.



Illus. 95 Example scenario 1 for variables in Dynamic Printer Matrix

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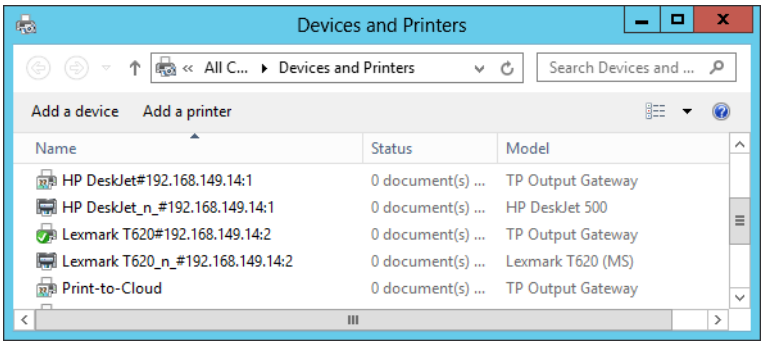
The individual printers of the Windows workstations are created according to ThinPrint naming conventions (here: TCP/IP) and shared on the central print server (cps47) in the main office, for example:

Printer name	Share name
HP DeskJet#192.168.131.124:1	HP DeskJet
Lexmark T620#192.168.131.124:2	Lexmark T620

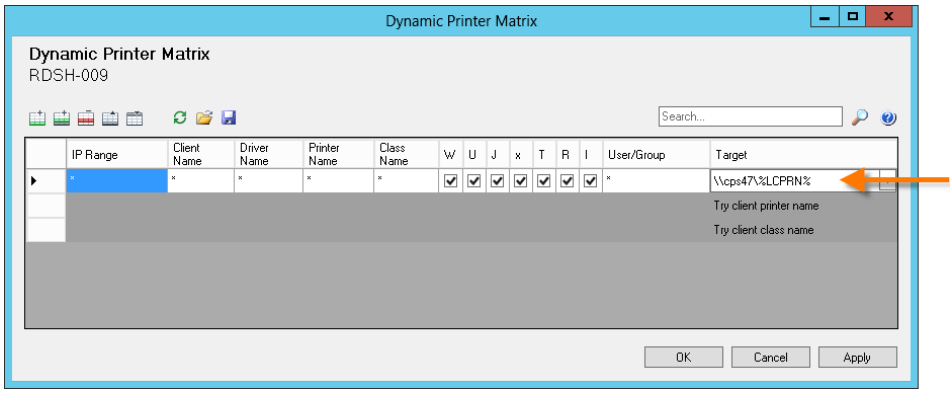


Illus. 96 Shared printers on the central print server

Only one entry is then necessary in Dynamic Printer Matrix, namely

```
\\cps47\%LCPRN%
```

where cps47 is the central print server (Illus. 97):



Illus. 97 Dynamic Printer Matrix: A single row is enough to map all printers of all workstations (under ideal conditions)

The printers folder is then displayed in the user's session as shown in Illus. 98.

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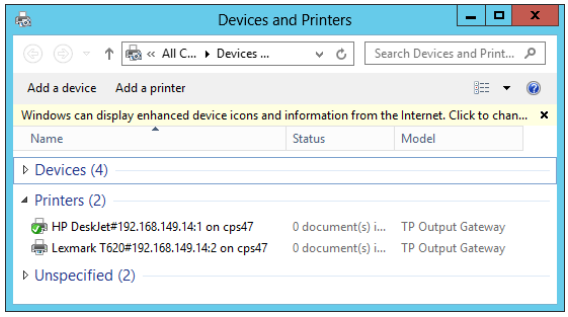
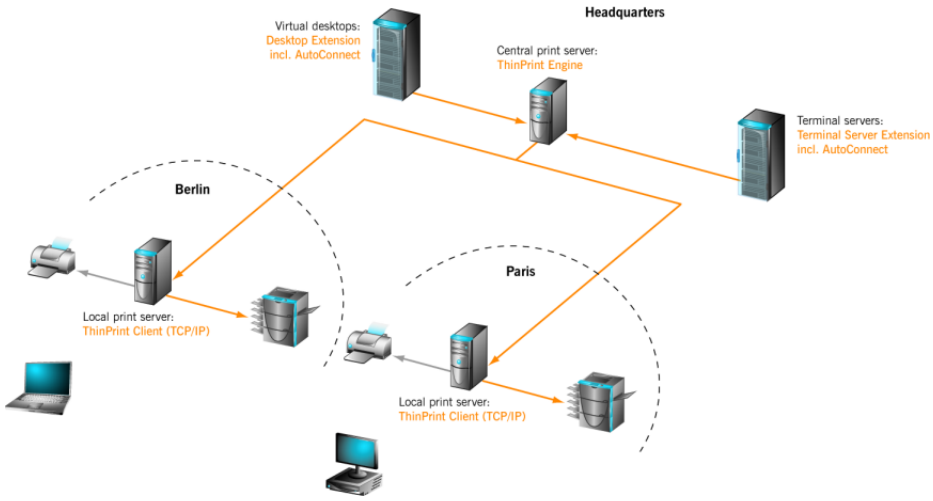


Illus. 98 Printers mapped in the session with one variable

Example with local print servers.
The main office has a terminal server or a VDI, plus a central print server with the ThinPrint Engine. Each of the branch offices has a local print server installed, with the ThinPrint Client as a Windows service (Illus. 99). The goal is to map the printers of the respective branch offices in the session of each user, using only one entry in Dynamic Printer Matrix.



Illus. 99 Example scenario 2 for the use of variables in Dynamic Printer Matrix

The printers of each branch office are created and shared on the local print servers (here: *Berlin* and *Paris*).

The individual printers of the various branch offices are created according to ThinPrint naming conventions (here: TCP/IP) and shared on the central print server (here: *cps47*) at the main office, for example:

Printer name	Share name
Lexmark Optra#berlin:1	Lexmark Optra_berlin
HP Color#berlin:2	HP Color_berlin
Lexmark Optra#paris:1	Lexmark Optra_paris
Epson Stylus#paris:2	Epson Stylus_paris

The printer ID (:1, :2) is the ID, as used in the ThinPrint Client on the local print server. Berlin and Paris are the names of the local print servers. In this example, we are

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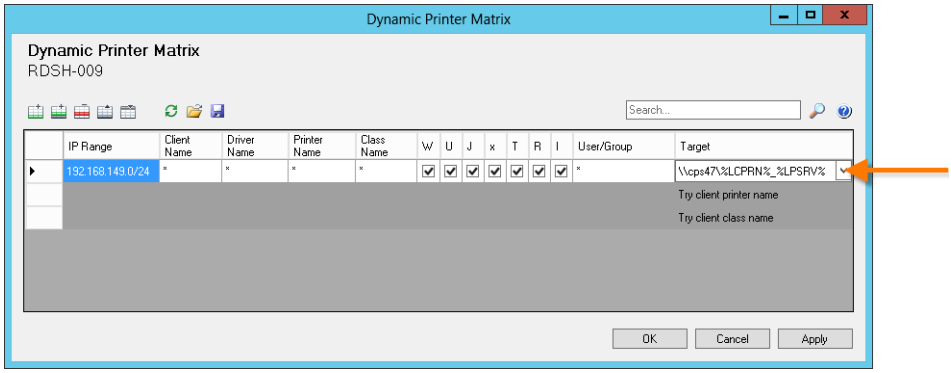
printing via TCP/IP. Only one entry is then necessary in Dynamic Printer Matrix, namely

```
\\cps47\%LCPRN%_%LPSRV%
```

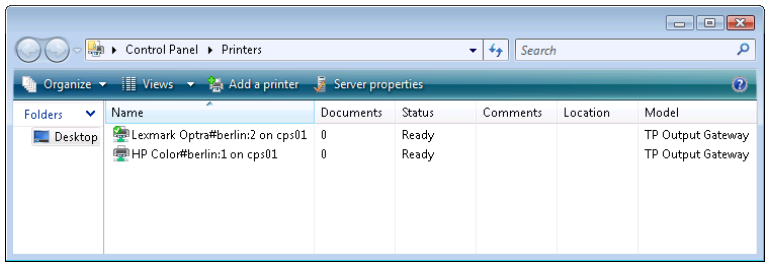
where *cps47* is the central print server (Illus. 100):



Illus. 100 Dynamic Printer Matrix: A single row is enough to map the printers of all the branch offices

The variable combination %LCPRN%_%LPSRV% is then translated based on the printer name in the ThinPrint Client of the user machine as follows: HP COLOR_BERLIN or EPSON STYLUS_PARIS. It thus exactly matches the share name on the central print server. Using this share, you can then print directly to the corresponding printer on the local print server: for example HP COLOR on the BERLIN print server.

The Printers folder is then displayed in the user's session as shown in Illus. 101 (example for Berlin).



Illus. 101 Printers created in the session with two variables

For more examples of using variables see Page 95 as well as the *ThinPrint Management Center* manual.

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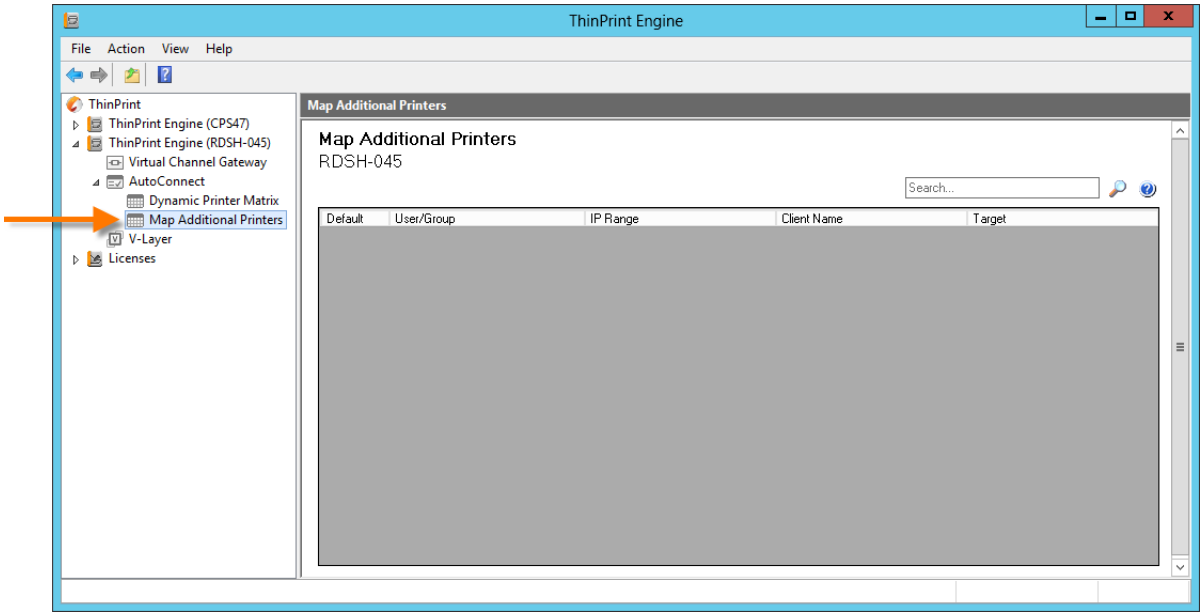
Map Additional Printers



Illus. 102 Open Map Additional Printers

The Dynamic Printer Matrix requires a ThinPrint Client on the user's workstation or thin client. If either, there is no ThinPrint Client available, or non-ThinPrint printers are to be mapped, further printer shares on any print server can be connected with the MAP ADDITIONAL PRINTERS option (Illus. 103).

Default	User/Group	IP Range	Client Name	Target
√	\\ourdomain\support	*	*	\\cps47\OKI_support
*	\\ourdomain\sales	*	*	\\cps47\lexmark_sales
*	\\ourdomain\marketing	*	*	\\cps47\HP_marketing

Unlike it's operation under Dynamic Printer Matrix, when AutoConnect works in MAP ADDITIONAL PRINTERS, it always works through all lines of the table from top to bottom and maps the same number of printers in one session as the number of lines with matching rules existing in the table. If a share entered under TARGET belongs to a printer that is connected to a ThinPrint Port, the resulting (= mapped by AutoConnect) printers print with ThinPrint; if not, then without.

For the function of **DEFAULT** column see Page 71.

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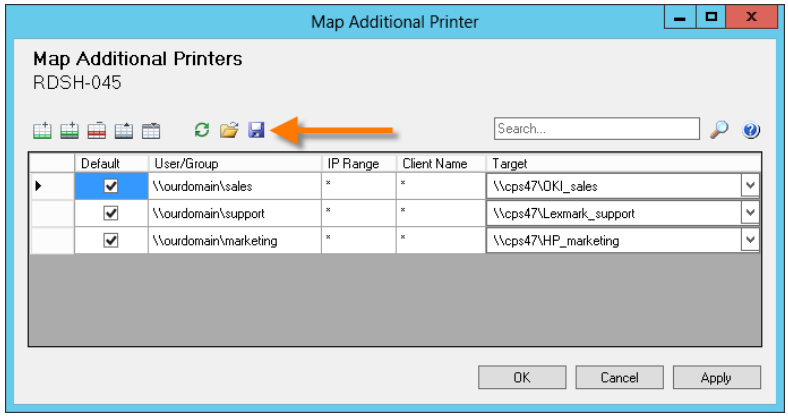

Illus. 103 Edit Map Additional Printers and export settings

Send, export and import the configuration

Similar to the port configuration, AutoConnect also has the additional options of SEND CONFIGURATION, EXPORT and IMPORT (Illus. 83 and 103). When sending, the entire AutoConnect configuration is sent to other computers; with export/import, only Dynamic Printer Matrix or Map Additional Printers tables are sent.

Caution! With Send and Import, an existing AutoConnect configuration will be overwritten. Ensure you save the existing configuration beforehand with the export function.

Send configuration

The SEND CONFIGURATION function allows for data from the AutoConnect configuration to be sent to groups of servers; see also *Procedure when sending* (Page 31).

Export/Import

The EXPORT function (Illus. 103) allows the contents of Dynamic Printer Matrix and Map Additional Printers to be written in a .csv file[22] (Illus. 104), so it can be opened in programs such as Microsoft Excel. Regardless of whether changes are made thereby, the current status can be applied to the relevant table on another server or to the GPOs, using the IMPORT function.

Note! To avoit editing a new table manually you can export it from Management Center, then – here – import it as well as tailor, if necessary. On this, see:

- the Management Center option Export to CSV
- das Skript Creating a CSV export file for Map Additional Printers

22 A .csv file is a text file for saving or exchanging simply structured data. The extension .csv stands for Character Separated Values or Comma Separated Values, because the individual values are separated by a special character (here: semicolon).

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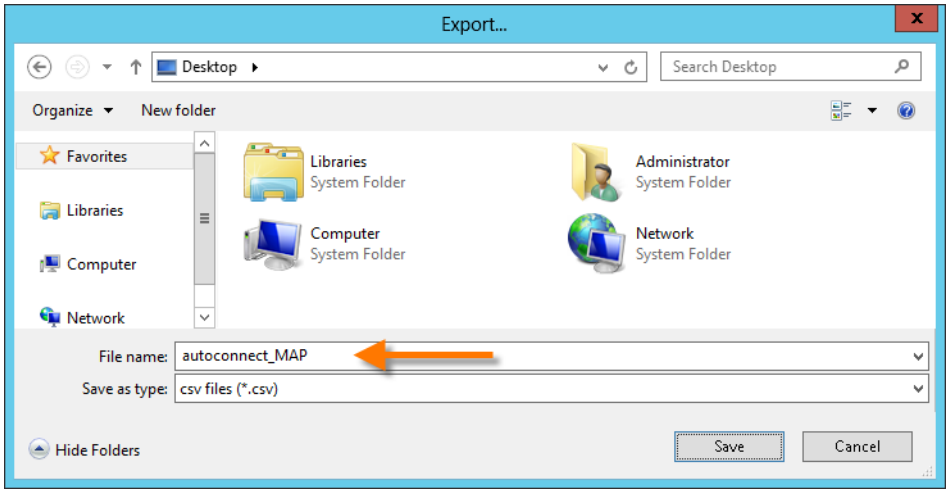

Illus. 104 Saving data in a .csv file

Script control

If you want to run AutoConnect from the Command Prompt or using a script, the following parameters (amongst other) can be used:

Parameter	Function
`-v`	(Verbose) Display messages; give detailed information at startup
`-d`	Delete the printer(s) for a specific session
`-dl`	Delete only local printers (on terminal servers)
`-dn`	Delete only connections to printer shares
-d *session_ID*	Delete all printer(s) of a specific session (admins only). The session ID can be found in the printers folder under LOCATION
`-d all`	Delete all printers created with templates (admins only)
`-r`	(Repair) Compares saved session information at actually existing printer objects (admins only)
`-F x`	Keep AutoConnect running and restart every x seconds
`-p` *port*	(Port) TCP/IP port number (if other than port 4000) Note: The TCP port numbers in ThinPrint Port, AutoConnect, and ThinPrint Client must match.
`-i` *protocol*	(Interconnection) Select protocol for connection to the ThinPrint Clients; overwrites AutoConnect dialog settings (acceptable values: TCPIP, VC, AUTO); see Illus. 84)

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Parameter	Function
`-a` *address*	Specification of IP address or client name of the computer on which a ThinPrint Client is running – i.e., of local print servers or external print servers of network printers (e.g., from SEH).
`-L`	Display ThinPrint Client's printer list
`-I` *printer ID*	Specification of selected printer IDs from ThinPrint Client – comma separated
`-I d`	Map only ThinPrint Client's CURRENT PRINTER
`-?` or `-h`	(Help) Will open parameter help panel

Applying changes

Once you have finished configuring AutoConnect, click APPLY or OK.

Virtual Channel Gateway

Introduction

Virtual Channel Gateway is only necessary if printers have to be targeted over RDP, ICA or PCoIP. It enables print jobs from central print servers to be sent to the client through a virtual channel of an RDP, ICA or PCoIP connection (Illus. 105). This also allows the targeting of printers that can't be reached over TCP/IP – for example, behind firewalls or with Network Address Translation (NAT).[23]

Virtual Channel Gateway is installed onto terminal servers or virtual desktops – while ThinPrint Engine runs on the central print server(s).

23 As an alternative to the ICA, RDP or PCoIP protocols, the Connection Service can also be used – e.g. for local print servers or for gateway appliances.

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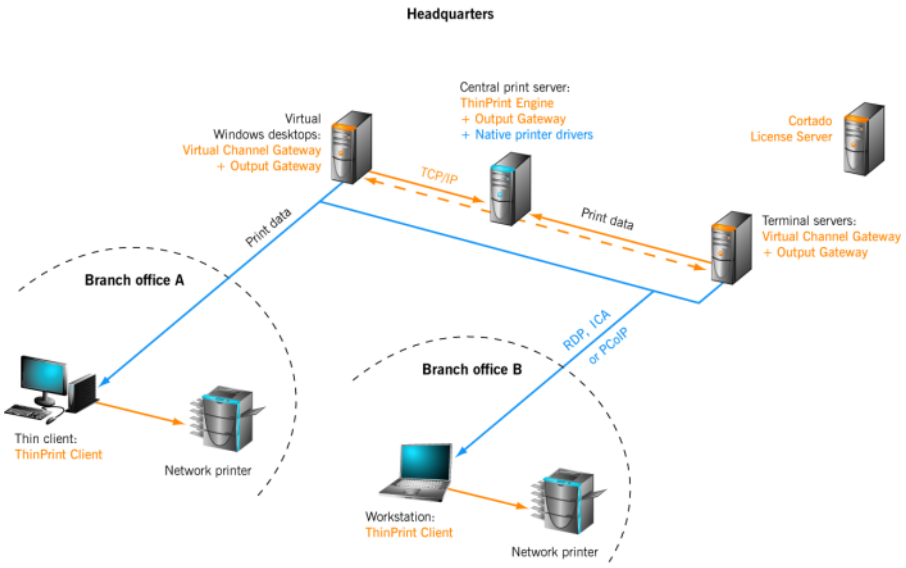

Illus. 105 Print jobs are sent (back) from the central print server via TCP/IP to the Virtual Channel Gateway on terminal servers or virtual desktops and then via RDP, ICA or PCoIP to workstations or thin clients

Installing Virtual Channel Gateway

Only use unambiguous accounts for printing over the Virtual Channel Gateway (i.e., not a guest account), and make sure that the desktop and the central print servers are not in different domains.

On terminal servers

Virtual Channel Gateway can be installed on terminal servers with the Terminal Server Extension option of ThinPrint Engine installer (see quick installation guide) and on desktop with the Desktop Extension installer.

On virtual desktops

Note that there is a slight difference between the Virtual Channel Gateway for virtual desktops and that for terminal servers. With the terminal server's version the IP addresses of print servers have to be set up.

In VMware Horizon View environments the Virtual Channel Gateway is a component of View Agent. It requires no administration at all.

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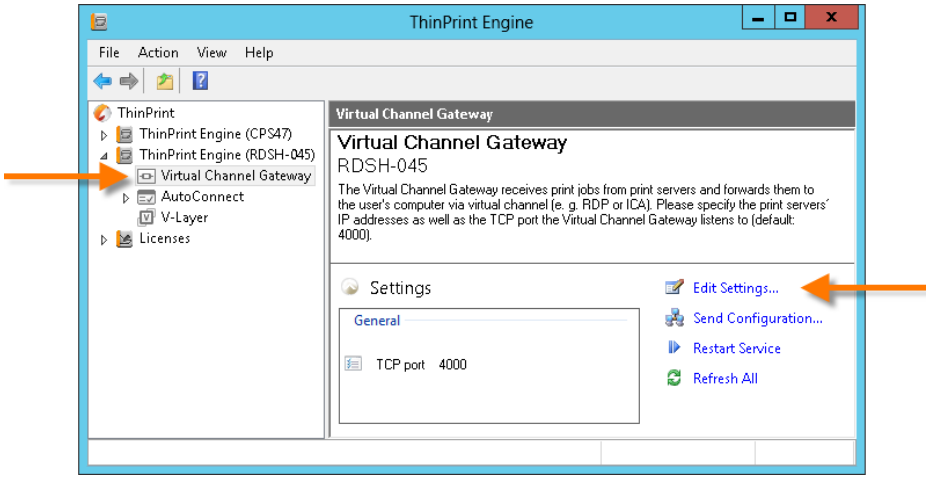
Configuring Virtual Channel Gateway

On terminal servers

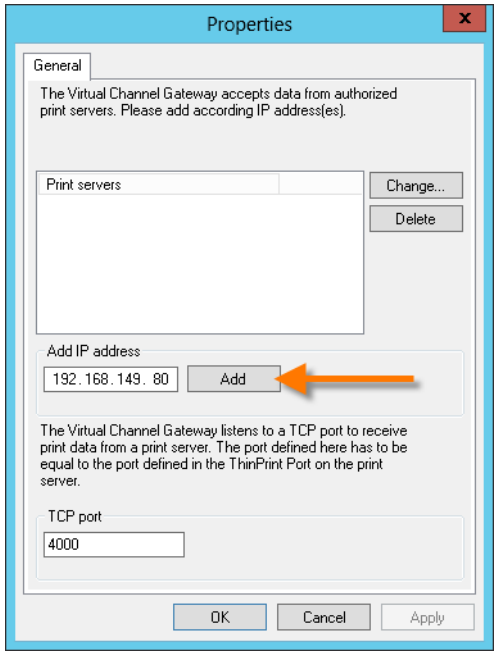
– On terminal servers, open VIRTUAL CHANNEL GATEWAY in the ThinPrint configuration (Illus. 106).
– Select EDIT SETTINGS.


ThinPrint Engine
File Action View Help
ThinPrint
ThinPrint Engine (CPS47)
ThinPrint Engine (RDSH-045)
Virtual Channel Gateway
AutoConnect
V-Layer
Licenses
Virtual Channel Gateway
Virtual Channel Gateway
RDSH-045
The Virtual Channel Gateway receives print jobs from print servers and forwards them to the user's computer via virtual channel (e. g. RDP or ICA). Please specify the print servers' IP addresses as well as the TCP port the Virtual Channel Gateway listens to (default: 4000).
Settings
General
TCP port 4000
Edit Settings...
Send Configuration...
Restart Service
Refresh All

Illus. 106 Virtual Channel Gateway configuration

Add (terminal servers only)

On terminal servers, select ADD to enter IP addresses of print servers, on which ThinPrint Engine is installed and on which Virtual Channel Gateway is to be used for printing (Illus. 107). For failover clusters add the IP addresses of all cluster nodes.


Properties
General
The Virtual Channel Gateway accepts data from authorized print servers. Please add according IP address(es).
Print servers
Change...
Delete
Add IP address
192.168.149. 80
Add
The Virtual Channel Gateway listens to a TCP port to receive print data from a print server. The port defined here has to be equal to the port defined in the ThinPrint Port on the print server.
TCP port
4000
OK
Cancel
Apply

Illus. 107 Add IP addresses of central print servers

Change Modify IP addresses for print servers

Delete Delete a print server's IP address

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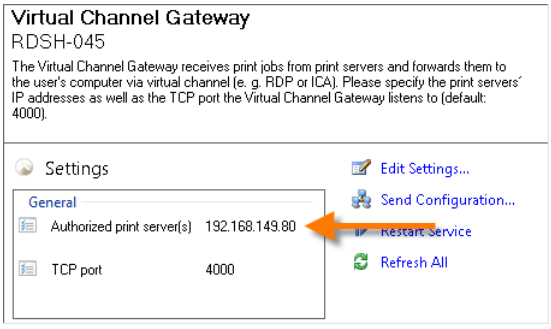
TCP port TCP Port number for TCP/IP communication with the ThinPrint Engine (default: 4000).
Tip: The TCP port numbers in ThinPrint Ports (on print servers) and Virtual Channel Gateway (on terminal servers or virtual desktops) must match. Make sure that no other application is using this port.

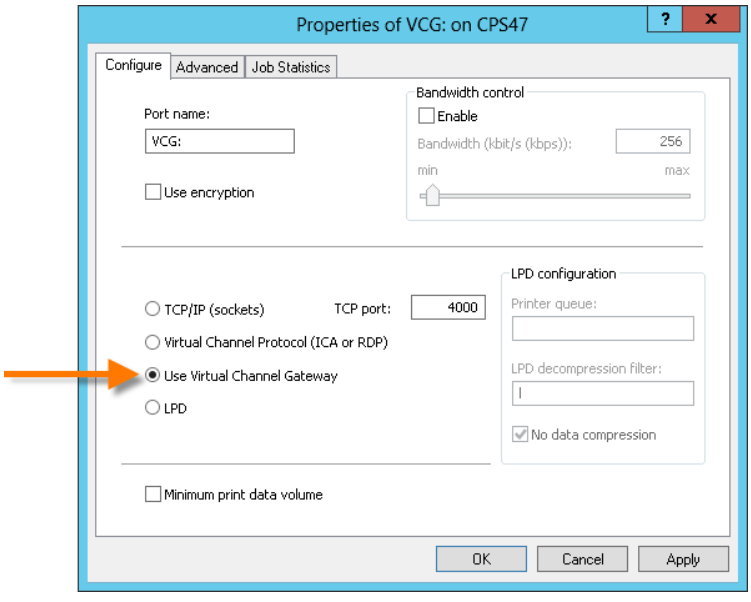
Apply Client APPLY or OK to confirm. The result is shown in Illus. 108.


Virtual Channel Gateway
RDSH-045
The Virtual Channel Gateway receives print jobs from print servers and forwards them to the user's computer via virtual channel (e. g. RDP or ICA). Please specify the print servers' IP addresses as well as the TCP port the Virtual Channel Gateway listens to (default: 4000).
Settings
General
Authorized print server(s) 192.168.149.80
TCP port 4000
Edit Settings...
Send Configuration...
Restart Service
Refresh All

Illus. 108 Virtual Channel Gateway configured

Further steps

– On the central print server: create ThinPrint Ports and select USE VIRTUAL CHANNEL GATEWAY in the port configuration (Illus. 109). (This can also be done with Management Center or Management Services.)



Illus. 109 Set ThinPrint Port to USE VIRTUAL CHANNEL GATEWAY

– Create printers, attach them to these ports and share them.
For **Windows devices**, create exactly one printer per printer model or per class of printer that uses **TP Output Gateway** as its printer driver (Illus. 141).
In contrast, for **non-Windows devices** create exactly one **V-Layer** pair per printer model (Illus. 144).
– Configure Dynamic Printer Matrix on the terminal server (Page 72) or in the respective Group Policy (Page 62).

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– Establish an RDP, ICA or PCoIP connection from a workstation to the terminal server or to the virtual desktops.
– In the session, open an application and perform a test print to each of these printers.

Cloud printing

Overview

With the Cloud Printing option you are able to send print data to mobile devices (iOS, Android or BlackBerry) and you can also forward print jobs via these devices to network printers. In this way, the print jobs can be rendered selectively in a Private Cloud (Illus. 110) or in a Public Cloud (Illus. 111). In detail, there are the following print options:

- **Print to Cloud Printer**
  Sending print jobs from a workstation or a remote desktop session to a smartphone or tablet. The mobile device can print the print job later on in a different location (see below *Printing to a mobile device or to network printers*). Alternatively the print jobs can be sent directly to network printers.
- **Print to ePaper**
  Sending files as PDF from a workstation or a remote desktop session to a smartphone or tablet (Page 91).
- Print to Instant Printer
  For printing from laptops on which printer drivers cannot be installed or – for security reasons – are not allowed to be installed

Printing to a mobile device or to network printers

Tablet or smartphone users can send print jobs from a remote desktop or workstation session via a print server, either to the Cortado app on their smartphone or tablet – to print them later, on a printer accessible via Wi-Fi – or directly to a network printer. To do so, they use either the **Cortado Corporate Server** enterprise solution (Illus. 110), or **Cortado Workplace/Teamplace,** in conjunction with the **Cortado app** on the smartphone or tablet (Illus. 111).

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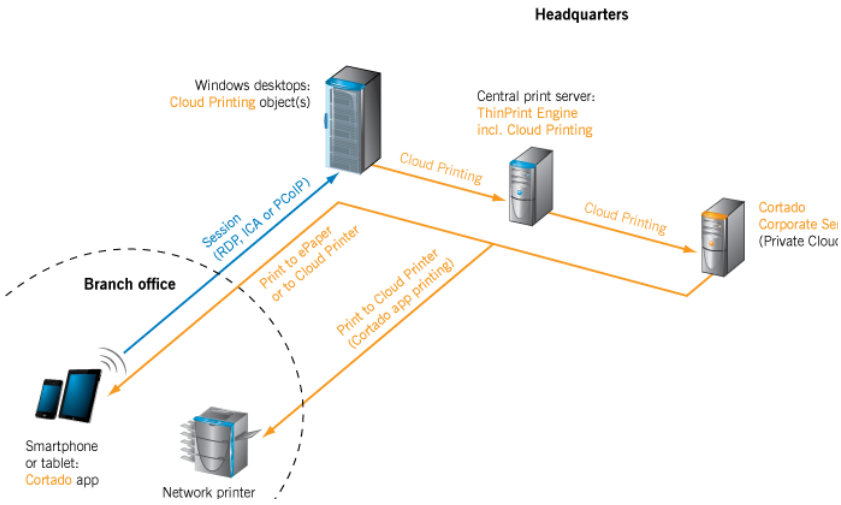
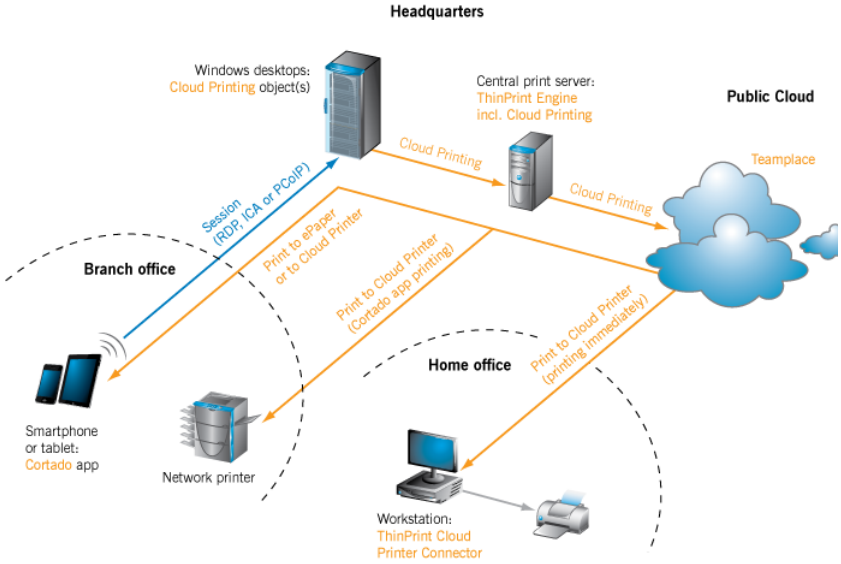


Illus. 110 Cloud Printing with a central print server and Cortado server



Illus. 111 Cloud Printing with a central print server and Cortado Workplace/Teamplace

Printing to workstation printers

Tablet or smartphone users can send print jobs **from a desktop session** – via a print server, directly to any printer connected to a Mac or PC – even outside the corporate network. To do so, they must have the **Cloud Printer Connector** installed on the PC or Mac to which the printer is connected (Illus. 111).

For the users to be able to print **directly from the tablet or smartphone,** they must also install the **Cloud Printer app** on their mobile device. More information about ThinPrint Cloud Printer can be found here:

http://cloudprinter.thinprint.com/en-us/getstarted.aspx

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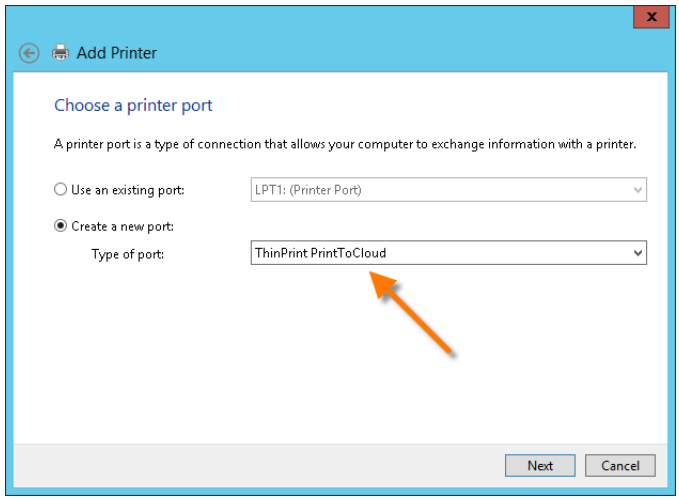
Setting up cloud printing

For Cloud Printing, the ThinPrint Engine installer creates the port monitor type ThinPrint PrintToCloud (Illus. 112).


Add Printer
Choose a printer port
A printer port is a type of connection that allows your computer to exchange information with a printer.
Use an existing port:
LPT1: (Printer Port)
Create a new port:
Type of port:
ThinPrint PrintToCloud
Next
Cancel

Illus. 112 Creating a ThinPrint PrintToCloud port

ThinPrint PrintToCloud ports offer the following options (Illus. 113):

- Cortado Workplace/Teamplace (= Public Cloud)
- Cortado Corporate Server (= Private Cloud)
- Print to Cloud Printer
- Print to ePaper
- Print to Instant Printer[24]

If the option PRINT TO CLOUD PRINTER was chosen, the users can access sent print jobs in the Cortado app, in the form of .tpf files (Illus. 117). (These .tpf files cannot be opened on the mobile device. They can only be forwarded to a printer.) Alternatively, with the PRINT TO EPAPER option, the file is sent to the Cortado app in PDF format.

The optional **Cloud Printer ID** is provided for the use of network printers with an integrated Cloud Printer Connector (Illus. 111). This field **is left empty when** using the **Cortado app.**

24 scheduled for printing using laptops on which printer drivers cannot be installed or – for security reasons – are not allowed to be installed

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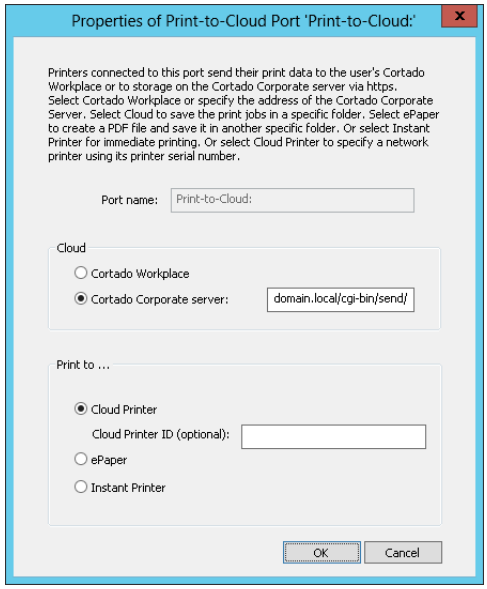
Properties of Print-to-Cloud Port 'Print-to-Cloud:'
Printers connected to this port send their print data to the user's Cortado Workplace or to storage on the Cortado Corporate server via https. Select Cortado Workplace or specify the address of the Cortado Corporate Server. Select Cloud to save the print jobs in a specific folder. Select ePaper to create a PDF file and save it in another specific folder. Or select Instant Printer for immediate printing. Or select Cloud Printer to specify a network printer using its printer serial number.
Port name:
Print-to-Cloud:
Cloud
Cortado Workplace
Cortado Corporate server:
domain.local/cgi-bin/send/
Print to ...
Cloud Printer
Cloud Printer ID (optional):
ePaper
Instant Printer
OK
Cancel

Illus. 113 Cloud Printing options

Default settings on the server

- If you are using **Cortado Teamplace** (Illus. 111) you only need to select between PRINT TO CLOUD PRINTER and PRINT TO EPAPER (Illus. 113).
- If you are using **Cortado Corporate Server** (Illus. 110), select this option, then enter the URL of the Cortado server as follows:
  https://<server_address>:<tcp_port>**/cgi-bin/send/**
  Example: `https://192.168.149.78/cgi-bin/send/`[25]
- In either case, choose the ThinPrint Output Gateway as the printer driver.
- Share the cloud printer objects on the central print server.

Self-signed SSL certificates?

If you are using **Cortado Corporate Server** (Illus. 110) with self-signed certificates please note: the connection to the Cortado server using ThinPrint PrintToCloud ports (see above) is SSL-encrypted (via https). Therefore, you must import the root certificate of the Cortado server – without key – onto the server running the ThinPrint Engine. This is only necessary when you use self-signed certificates.

You can find the Cortado root certificate in the MMC, on the Cortado server, under CONSOLE ROOT⟶ CERTIFICATES (LOCAL COMPUTER)⟶ TRUSTED ROOT CERTIFICATION AUTHORITIES⟶ CERTIFICATES (Illus. 114). Import it into the same location on the central print server.

25 Note that the address notation must match the one given in Cortado server's SSL certificate: IP address, hostname or FQDN.

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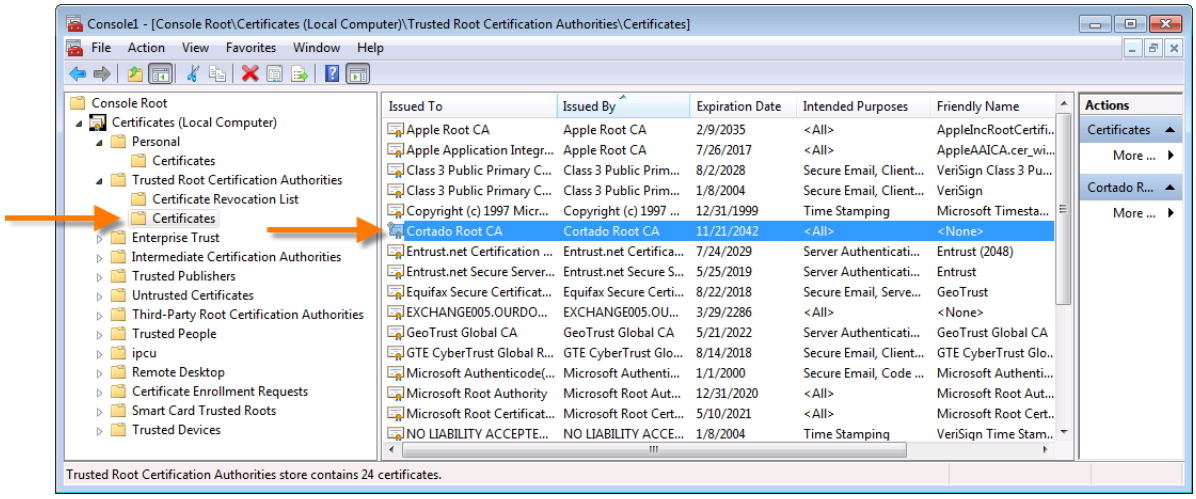

Illus. 114 MMC Cortado server: export Cortado root certificate

User settings

Within a desktop session, users have the option, with the *Print to Cloud Printer* function, to print jobs to a Cortado Teamplace client installed on a smartphone (or tablet). With the Cortado app, you can print at a later time in another location.

To be able to send the print jobs to the – right – printers of your users the users must **register** themselves before:

https://cloudcentral.cortado.com/?action=register&app=cloudprinterwebapp

Here, they can use any – e.g. private – e-mail account. This e-mail account represents their Cortado ID (= credential for the Cortado Teamplace account).

The users must then install the Cortado app on their smartphone or tablet. More information on the installation and use of Cortado Teamplace can be found here:

https://www.teamplace.net/en-us/

and of Cortado Corporate Server here:

https://corporateserver.cortado.com/en-us/overview.aspx

Additionally, users should first open the printers folder on their desktop session and then access the context menu by right-clicking on the cloud printer. When using the public cloud, the user's Cortado Teamplace access credentials can then be saved in the CORTADO ID tab (Illus. 115, right), under PRINTER PROPERTIES⟶ PREFERENCES (Illus. 115, left). So it isn't necessary to enter them at each time.

Otherwise, when Cortado Corporate Server (= private cloud) is used, the users must enter their UPN here – instead of their e-mail address. See also the *Cortado Corporate Server* manuals.

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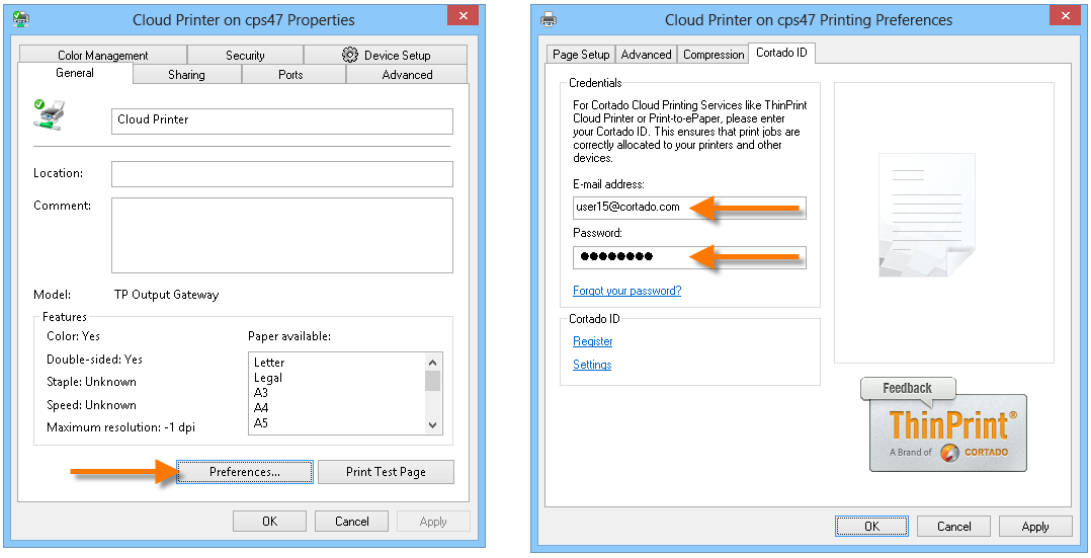
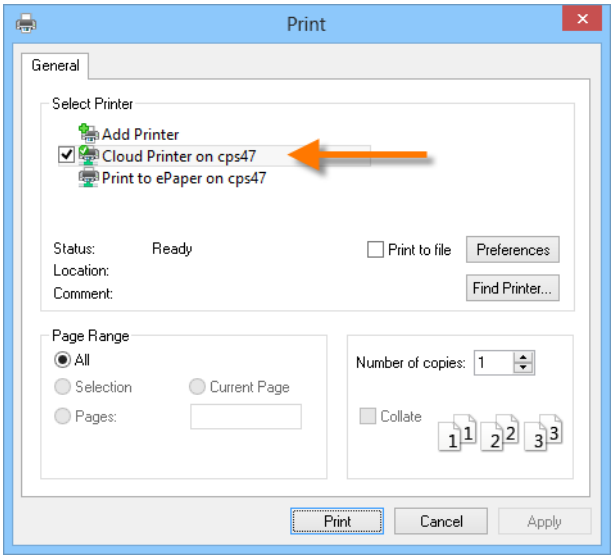


Illus. 115 Entering Cloud Printing credentials

Printing

For printing the Cortado app is only necessary if the Cloud Printer Connector isn't used because this transmits the print jobs immediately to the physical printer configured there.

To be able to open or print files using the Cortado app, a print job must first be sent from a desktop session to a Cloud Printer (Illus. 116).



Illus. 116 Selecting a Cloud Printer

If the printer object being used is set to the *Print to Cloud Printer* option, the sent print data will be stored in EMF data format (*.tpf file) in the Cortado app's PRINT JOBS folder, which is accessible from the user's smartphone or tablet (Illus. 117). If required, it can then be printed using the print function of the Cortado app.

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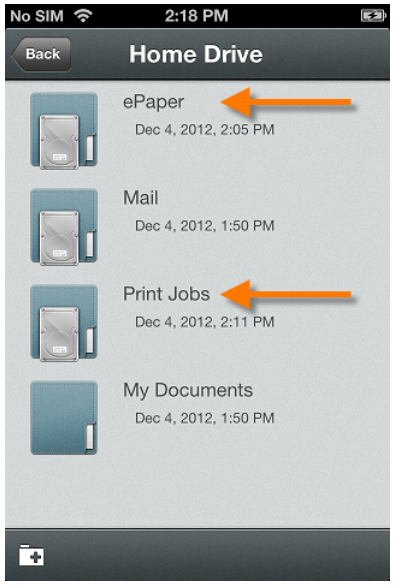
If the printer object being used is set to the Print to ePaper option, the data will be converted to the PDF format, and will appear in the Cortado app's EPAPER folder. Once here, they can then be both read and/or printed.



Illus. 117 Print Jobs and ePaper folders in the Cortado app (example for iOS)

Praxis: Creating and connecting printers

In the following, we present typical scenarios to show, firstly, how the required printers are created on the central print servers and then, how those printers, with the help of AutoConnect, can be connected (= mapped) to users in their sessions.[26]

Running applications on terminal servers or virtual desktops

For the installation of single components, see the Quick Installation guide of *ThinPrint Engine on print servers*.

Network printers

Preconditions (see Illus. 118)

- Installed on terminal servers or virtual desktops are:
  - the virtual printer driver **TP Output Gateway**[27]
  - the ThinPrint mapping component **AutoConnect**[27]
- The **ThinPrint Engine** is installed on the central print server.
- Installed on the local print server are:
  - **printers**
  - **ThinPrint Client (TCP/IP type)**

  Alternatively, devices with integrated ThinPrint Client can be used (e.g. TPG-25/65/125 or ISD300/4x0 from SEH).

26 The same scenarios can be found in the Management Center documentation. There, the same printers and ports are created automatically using the Management Center.

27 Included in VMware Tools/Horizon View Agent as Virtual Printing

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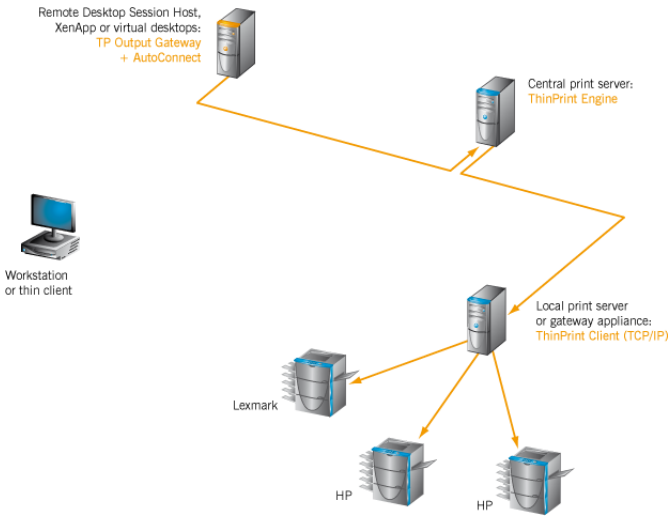
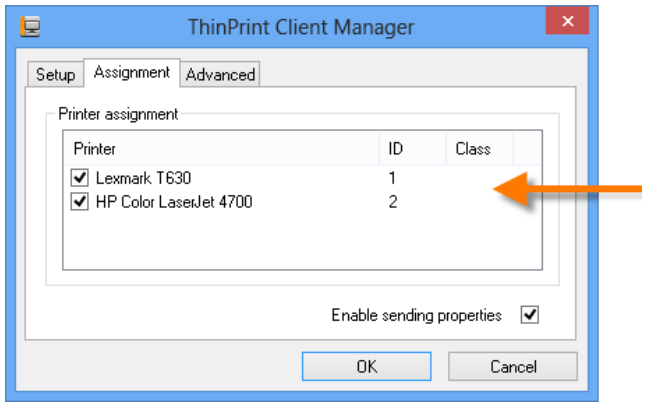


Illus. 118 Print data route: Terminal server⟶ central print server⟶ local print server⟶ printers

Finding printer IDs

1. On the local print server (here: lps-8): open the ThinPrint Client Manager to find the IDs of the printers (here: ID 1 for Lexmark and ID 2 for HP, see Illus. 119).



Illus. 119 Local print server: Finding out printer IDs

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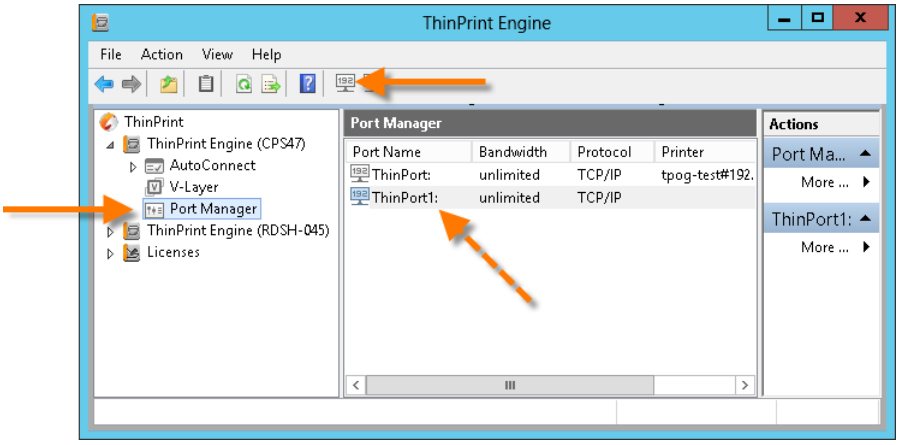
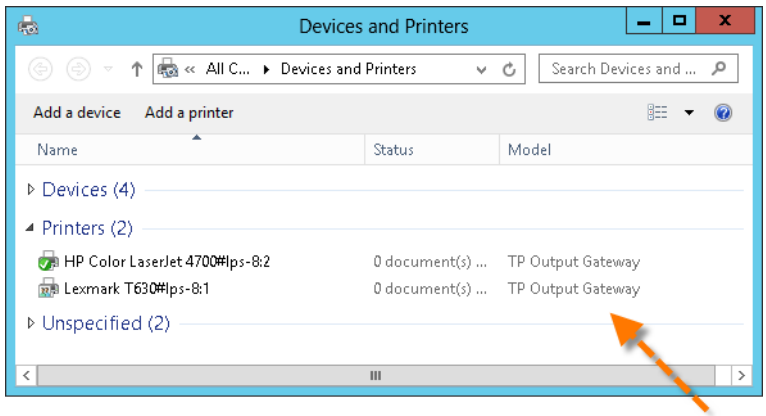
Creating ThinPrint Ports and printers

2. On the central print server: open the ThinPrint configuration and select on the left side (in the tree): ThinPrint⟶ ThinPrint Engine⟶ Port Manager (Illus. 120).



Illus. 120 ThinPrint Port(s) in the configuration console (= Port Manager)

3. Create multiple ThinPrint Ports with their default settings. To do so, click New ThinPrint Port (top arrow in Illus. 120).
4. Open the central print server's printers folder or Print Management and create ThinPrint printer objects with which it is possible to send print jobs to the local print server.
   In each case of the *Driver Free Printing* print mode, select TP Output Gateway as the printer driver (Illus. 121). In each case of the *V-Layer* print mode, select the native printer driver (Illus. 122).
   Please observe the printer name syntax:
   printer_name#client_address:printer_ID, here:
   Lexmark T630#lps-8:1 and
   HP Color LaserJet 4700#lps-8:2


Devices and Printers
All C... Devices and Printers
Search Devices and ...
Add a device Add a printer
Name Status Model
Devices (4)
Printers (2)
HP Color LaserJet 4700#lps-8:2 0 document(s) ... TP Output Gateway
Lexmark T630#lps-8:1 0 document(s) ... TP Output Gateway
Unspecified (2)

Illus. 121 Creating printer objects for Driver Free Printing

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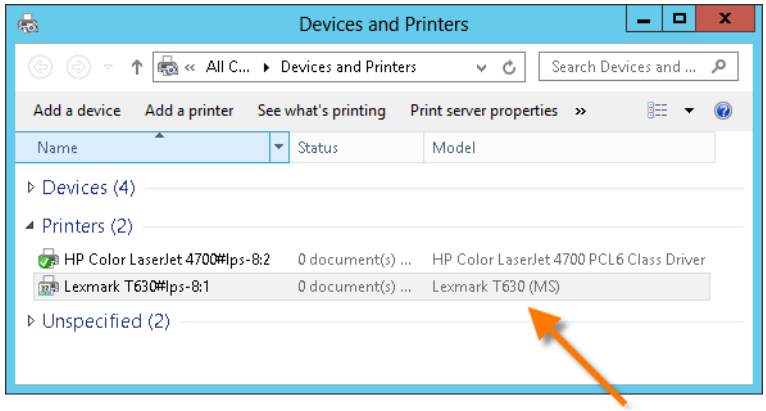
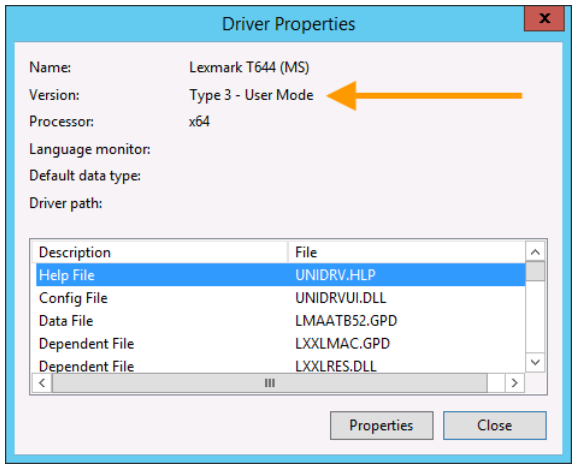


Illus. 122 Creating V-Layer printer objects

Note! From Windows 2012 R2 typ-4 drivers can't be connected to third-party printer ports. That's why use type-3 drivers with ThinPrint Ports (Illus. 41).



Illus. 123 Example for a type-3 driver, here: *Lexmark T644 (MS)*

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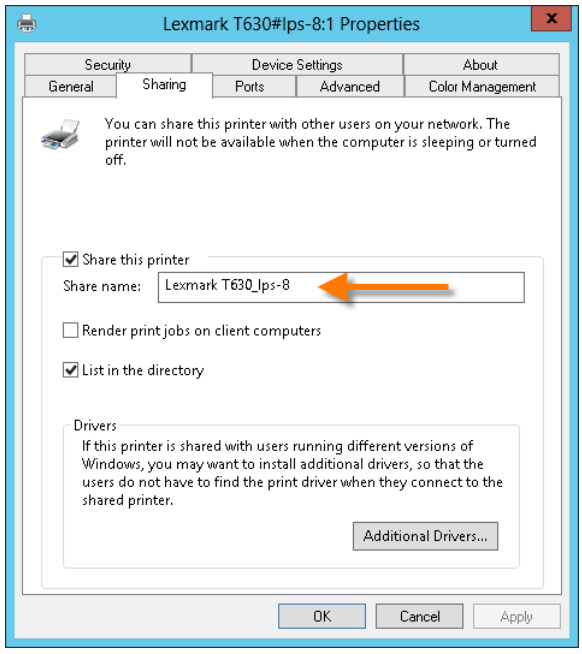
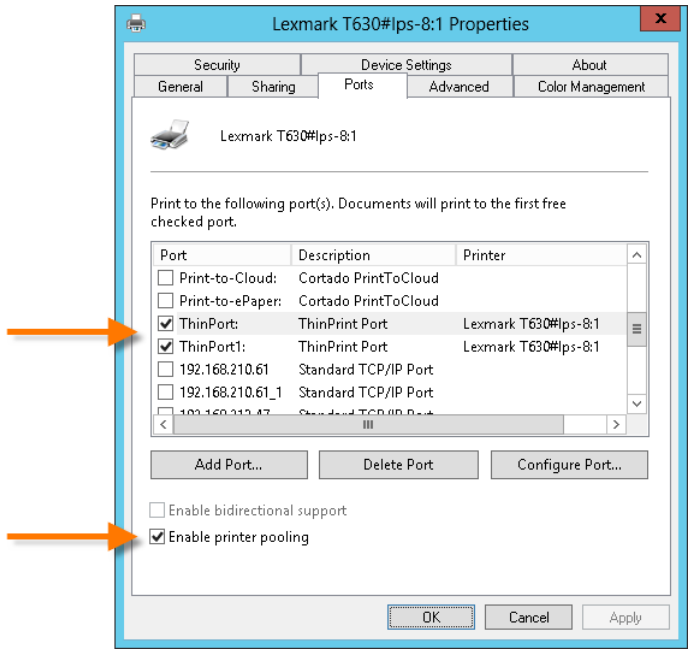
5. Share the printer objects. Include both the client machine's **printer names** and the **client** machine's **name** in the share name to make sure that the **share names** are unique on the central print server (Illus. 124), here:
   Lexmark T630_lps-8 and
   HP Color LaserJet 4700_lps-8


Lexmark T630#lps-8:1 Properties
Security
Device Settings
About
General
Sharing
Ports
Advanced
Color Management
You can share this printer with other users on your network. The printer will not be available when the computer is sleeping or turned off.
Share this printer
Share name:
Lexmark T630_lps-8
Render print jobs on client computers
List in the directory
Drivers
If this printer is shared with users running different versions of Windows, you may want to install additional drivers, so that the users do not have to find the print driver when they connect to the shared printer.
Additional Drivers...
OK
Cancel
Apply

Illus. 124 Sharing a printer (example), share name contains both the printer name and the target machine's hostname – separated by an underscore (_)

6. Enable port pooling with the ThinPrint Ports, for both printers, if you want for more than one printer to be able to print at the same time (Illus. 125).



Illus. 125 Enable Port Pooling if necessary

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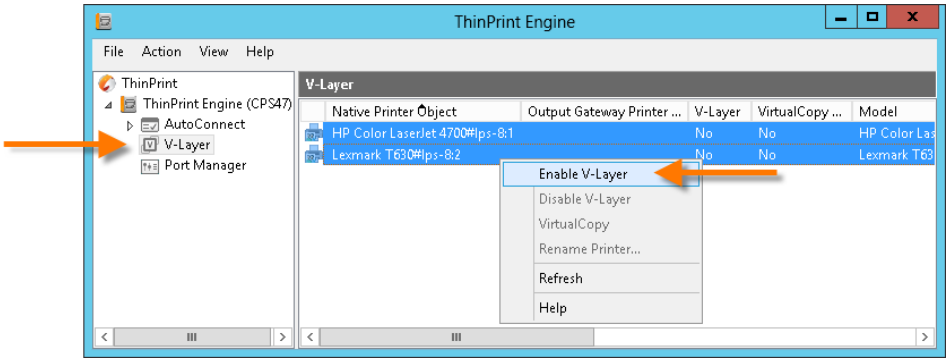
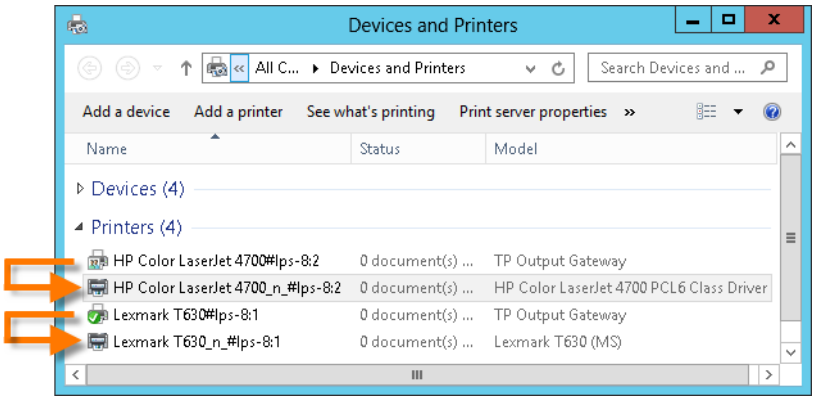
V-Layer

7. Did you chose to use V-Layer as print mode, go to V-LAYER in the console tree. ENABLE V-LAYER for all printers that use a native driver (in the context menu, Illus. 126). The result is shown in Illus. 127.



Illus. 126 Enabling V-Layer for all printers that use a native driver



Illus. 127 V-Layer printer pairs on the central print server

Configuring Auto-Connect

The ThinPrint component **AutoConnect** connects the above applied printers into a session on a terminal server or virtual desktop (= printer mapping). AutoConnect has two tables to set up the mapping rules:

- Dynamic Printer Matrix and
- Map Additional Printers

Dynamic Printer Matrix is the more easily operated of the two tables. Functioning under the assumption that there is a ThinPrint Client present on the client side, it requests information from the client about its printers, then uses that information for processing the mapping rules. Thus, AutoConnect attempts to create *exactly one printer object for each printer* for which it receives a report back from **ThinPrint Client**.

In contrast, when using the table **Map Additional Printers**, *all printer* those printers that are in the table and for which a rule applies, *are created* in the session, regardless of the presence of a ThinPrint Client.

Alternative 1 • Dynamic Printer Matrix.

Advantage:	Printer names don't have to be entered
Disadvantage:	Requires ThinPrint Client

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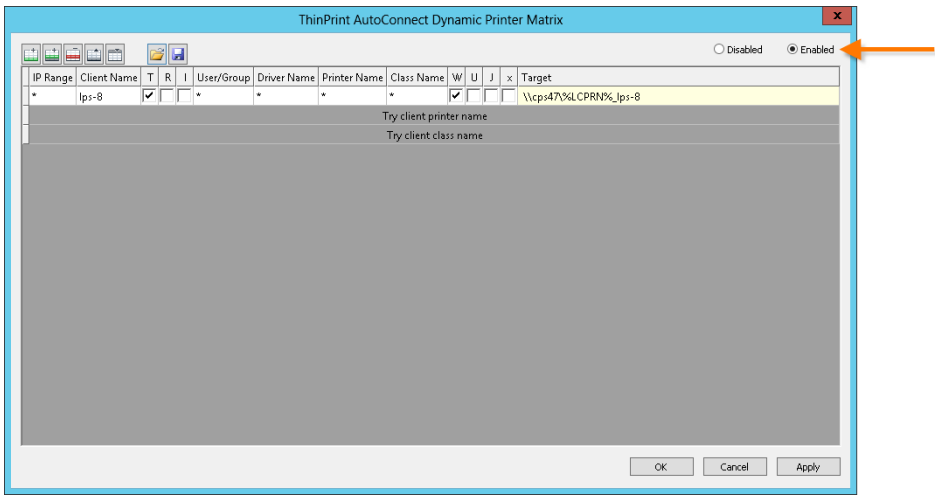
Proceed as follows:

1. Go to *Dynamic Printer Matrix* on the Active Directory server, on the terminal server, or on the virtual or physical desktop (Page 63).
2. Click ENABLED to activate the table (top right in Illus. 128), and enter a new row with the following content in its TARGET column:
   *server_address**share_name*, here:
   \\cps47\%LCPRN%_lps-8
   (%LCPRN% is a variable for printer names. To run properly, the print server's share names and the client machine's printer names must match.)
3. Click OK to close Dynamic Printer Matrix.

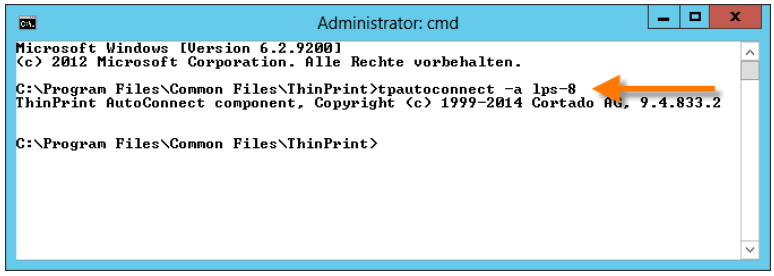


Illus. 128 Active Directory: Dynamic Printer Matrix

4. Create logon scripts for the users, with the following content (Illus. 129, example):

```
c:
cd C:\Program Files\Common Files\ThinPrint\
tpautoconnect -d
tpautoconnect -a lps-8
```

   (-dl deletes local printers, -dn deletes connections to printer shares, -a specifies ThinPrint Client's address)


Administrator: cmd
Microsoft Windows [Version 6.2.9200]
(c) 2012 Microsoft Corporation. Alle Rechte vorbehalten.
C:\Program Files\Common Files\ThinPrint>tpautoconnect -a lps-8
ThinPrint AutoConnect component, Copyright (c) 1999-2014 Cortado AG, 9.4.833.2
C:\Program Files\Common Files\ThinPrint>

Illus. 129 Connecting printers with AutoConnect (here: on the command line)

5. Perform an update of the group policy for the terminal servers and/or virtual desktops.

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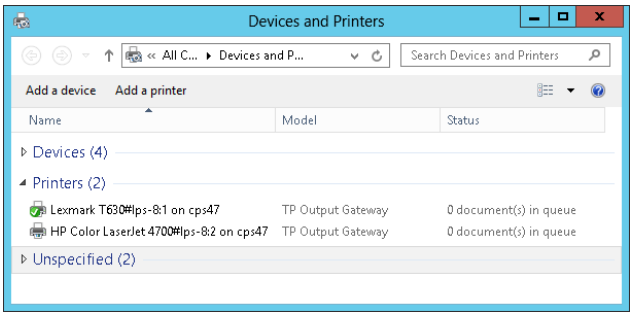
6. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 130).



Illus. 130 Two printers mapped in a session by AutoConnect

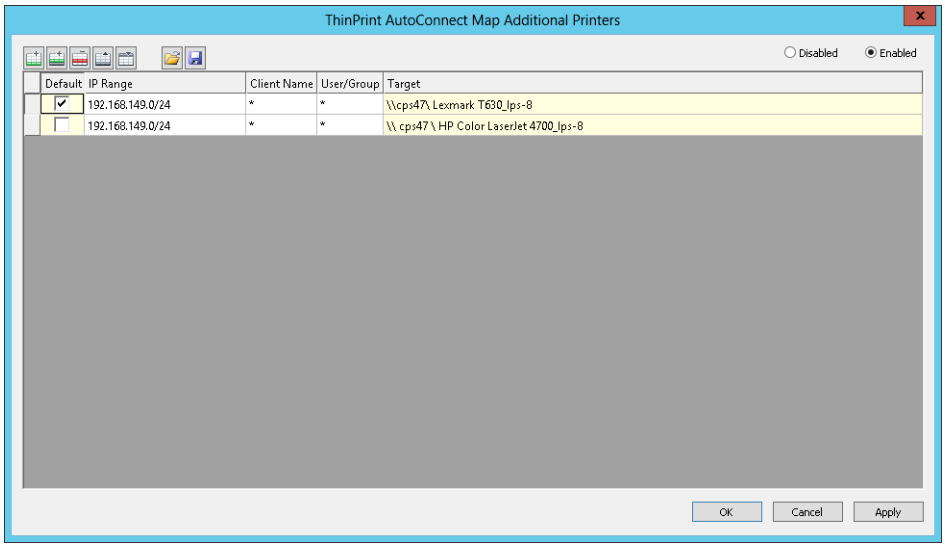
Alternative 2 • Map Additional Printers.

Advantage:	ThinPrint Clients are not required
Disadvantage:	A rule has to be entered for every printer.

1. Go to *Map Additional Printers* table on the Active Directory server, on the terminal server, or on the virtual or physical desktop (Page 63). Click ENABLED to activate the table (top right in Illus. 131), and enter a new row with the following content in its TARGET column:

   *server_address**share_name*, here:
   \\cps47\Lexmark T630_lps-8
   \\cps47\HP Color LaserJet 4700_lps-8

   Click OK to close Map Additional Printers table.



Illus. 131 Active Directory: Map Additional Printers

2. Perform an update of the group policy for the terminal servers and/or virtual desktops.

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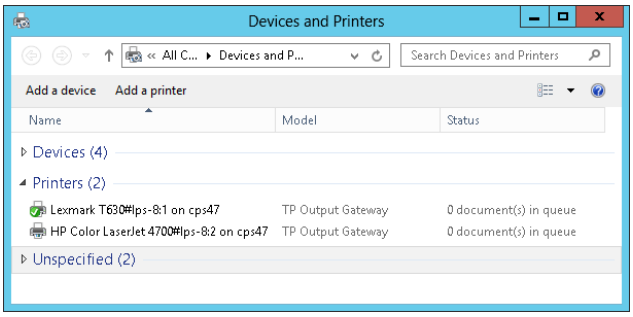
3. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 132).

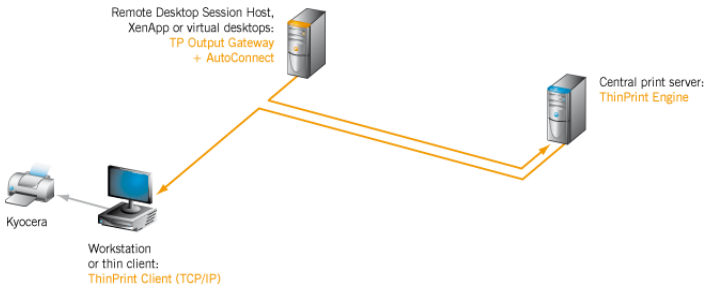


Illus. 132 Two printers mapped in a session by AutoConnect

Printers connected locally to workstations or thin clients

Requirements (see Illus. 133)

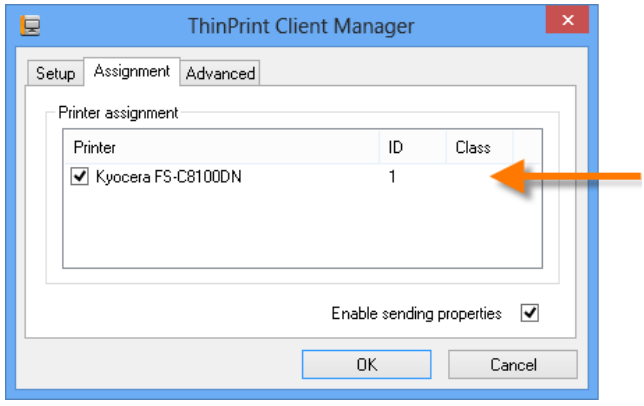
- Installed on terminal servers or virtual desktops are:
  - The virtual printer driver **TP Output Gateway**[27]
  - The ThinPrint mapping component **AutoConnect**[27]
- **ThinPrint Engine** is installed on the central print server.
- Installed on the workstation or the thin client are:
  - **Printers**
  - **ThinPrint Client (TCP/IP type)**



Illus. 133 Print data route: terminal server⟶ central print server⟶ workstation⟶ printer

Finding printer IDs

1. On the workstation (here: ws-87): open the ThinPrint Client Manager to determine the IDs of the printers (here: ID 1 for Kyocera, see Illus. 134).



Illus. 134 Workstation: Finding out printer ID

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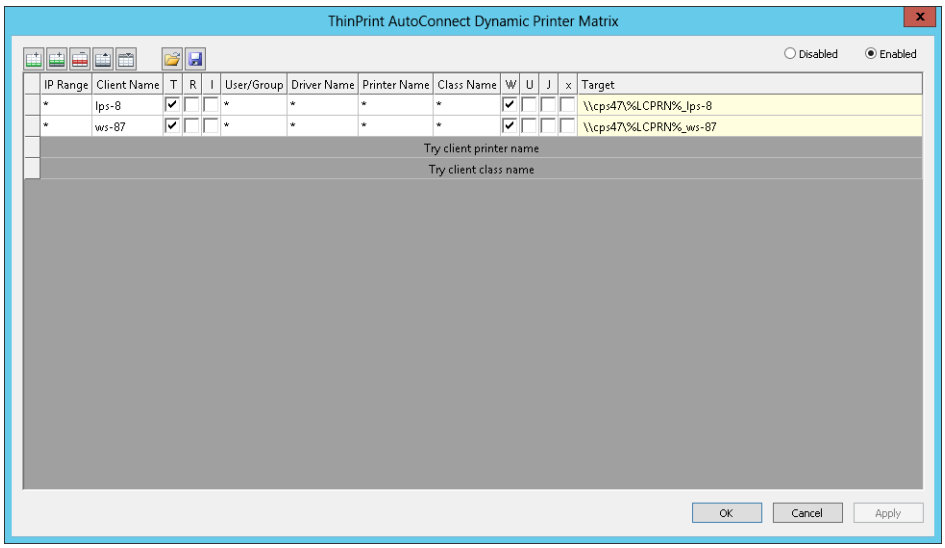
2. Proceed as described in *Creating ThinPrint Ports and printers* and *V-Layer* (Pages 97 to 100). Add a printer with the following denomination:
   Kyocera FS-C8100DN#ws-87:1
3. Assign this printer to the same port pool (Illus. 125).

Configuring Auto-Connect

Because, in this scenario, ThinPrint Engine sends the print output to printers installed locally, either on workstations or on thin clients (Illus. 133), the ThinPrint Client is installed on those. Therefore, the printer mapping is carried out here with Auto-Connect's Dynamic Printer Matrix. Proceed as follows:

1. Change to *Dynamic Printer Matrix* on Active Directory server, terminal server or virtual or physical desktop (Page 63).
2. Enter a row with the following content in the TARGET column (Illus. 135):
   *server_address**share_name*, here:
   \\cps47\%LCPRN%_ws-87
   (%LCPRN% is a variable for printer names. To run properly the print server's share names and the client machine's printer names must match.)
3. Click OK to close Dynamic Printer Matrix.

Note! For multiple workstations with locally attached printers the variable %LHOST% can be used (Page 77) instead of the workstations' host name. So only a single row is needed for all clients. For example, enter in the TARGET column:
\\cps47\%LCPRN%_%LHOST%



Illus. 135 Active Directory: Dynamic Printer Matrix

4. Perform an update of the group policy for the terminal servers and/or virtual desktops.

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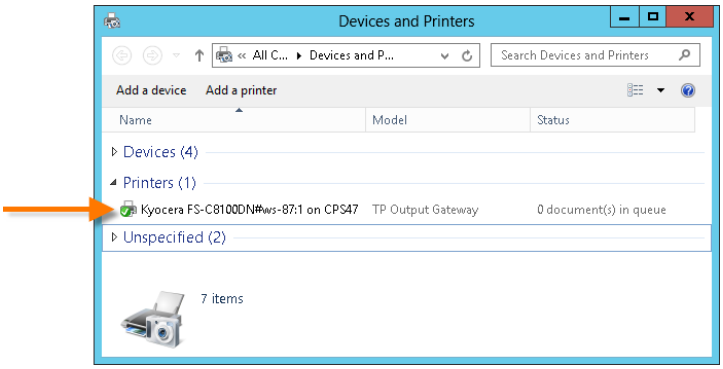
5. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 136).

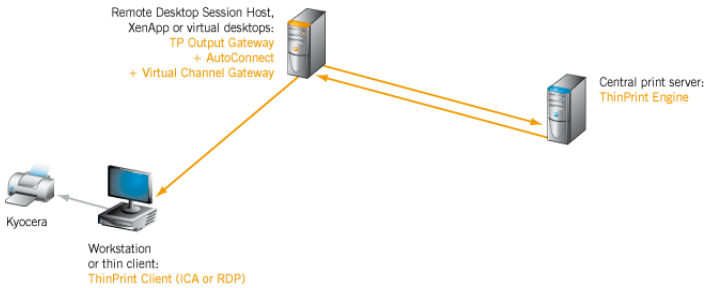


Illus. 136 Printer mapped by AutoConnect in a session

Local printers for mobile or home users

Preconditions (see. Illus. 137)

- Installed on terminal servers or virtual desktops are:
  - the virtual printer driver **TP Output Gateway**[27]
  - the ThinPrint mapping component **AutoConnect**[27]
  - **Virtual Channel Gateway**[27] , to deliver the print output via RDP, ICA or PCoIP
- **ThinPrint Engine** is installed on the central print server.
- Installed on the workstation or the thin client are:
  - **printers**
  - **ThinPrint Client (RDP type)** or **ThinPrint Client (ICA type)** or VMware Horizon View Client (with embedded ThinPrint Client PCoIP type)



Illus. 137 Print data route: terminal server⟶ central print server⟶ terminal server⟶ workstation⟶ printer

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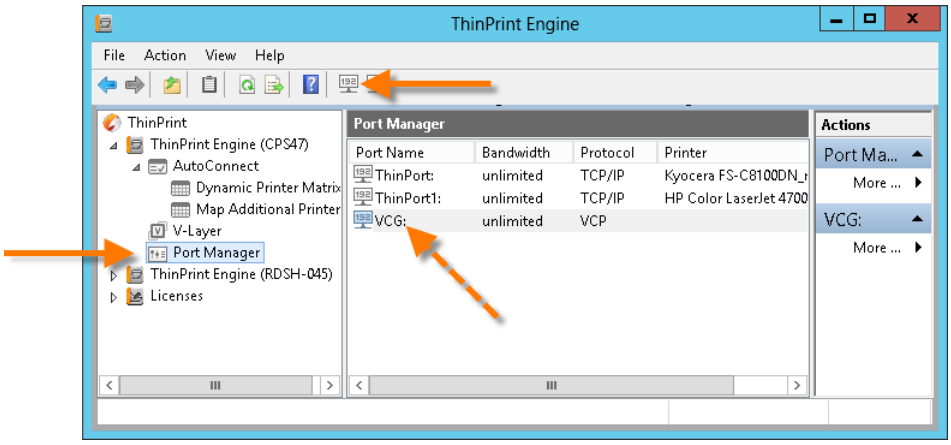
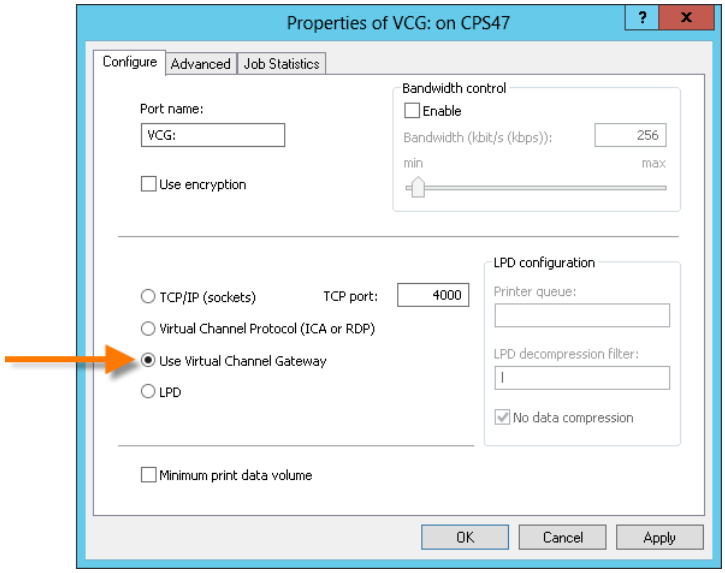
Procedure

6. In the ThinPrint Engine configuration select PORT MANAGER on the left side (Illus. 138).



Illus. 138 ThinPrint Port USE VIRTUAL CHANNEL GATEWAY type created

7. You can create multiple ThinPrint Ports with the property USE VIRTUAL CHANNEL GATEWAY (Illus. 139). To do so, select in each case, NEW THINPRINT PORT in each case (top arrow in Illus. 138).



Illus. 139 Select ThinPrint Port of the type USE VIRTUAL CHANNEL GATEWAY

8. Open the central print server's printers folder, or Print Management, and create ThinPrint printer objects with which it will be possible to send print jobs to mobile or home users.

When creating the printer objects on the central print server, there are three case to be distinguished:

- **Case 1**: Windows clients are used, and print jobs are sent **only to the local default printer.**
- **Case 2**: Windows clients are used. If **more than one printer** is used these are to be selected directly in the session.

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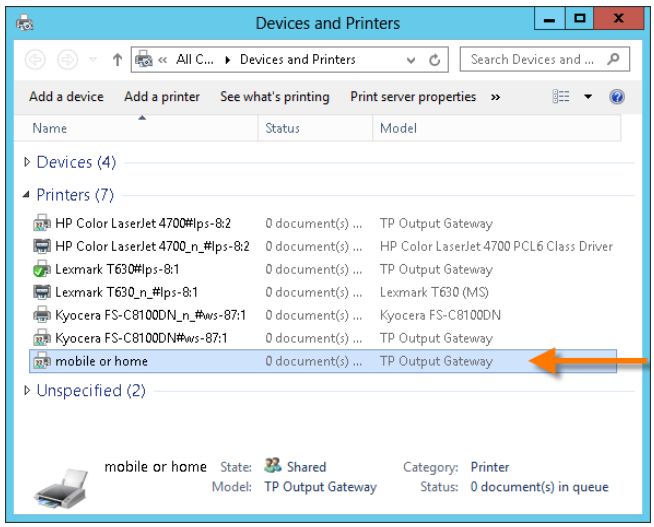
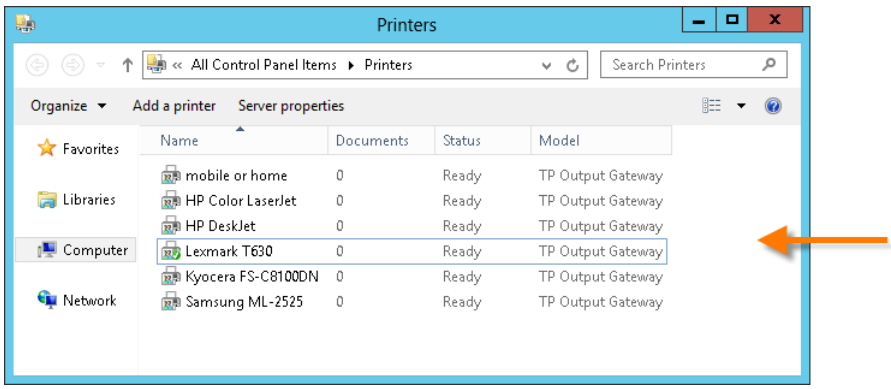
- **Case 3**: Non-Windows clients are used. To be able to print using **V-Layer**, the native printer driver has to be assigned.

9. Case 1: Create a printer that uses TP Output Gateway as driver, and assign it to the ThinPrint Port of the type USE VIRTUAL CHANNEL GATEWAY, or to the respective port pool (Illus. 140). **Do not specify a printer ID**. Share this printer: **share name = printer name**.



Illus. 140 Case 1: Create one Output Gateway printer

10. Case 2: For each printer model, create a printer that uses TP Output Gateway as driver. Assign the printers to the port pool of the type USE VIRTUAL CHANNEL GATEWAY (Illus. 141). **Do not specify printer IDs**. Share these printers: **share name = printer name**.



Illus. 141 Case 2: Create an Output Gateway printer for each printer model

11. Case 3: For each printer model, create a printer that uses its native driver. Assign the printers to the port pool of the type USE VIRTUAL CHANNEL GATEWAY (Illus. 142). **Do not specify printer IDs**. Share these printers: **share name = printer name**.

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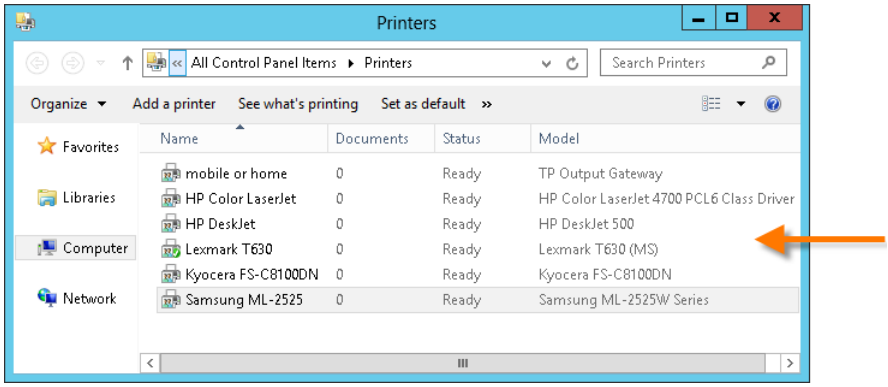
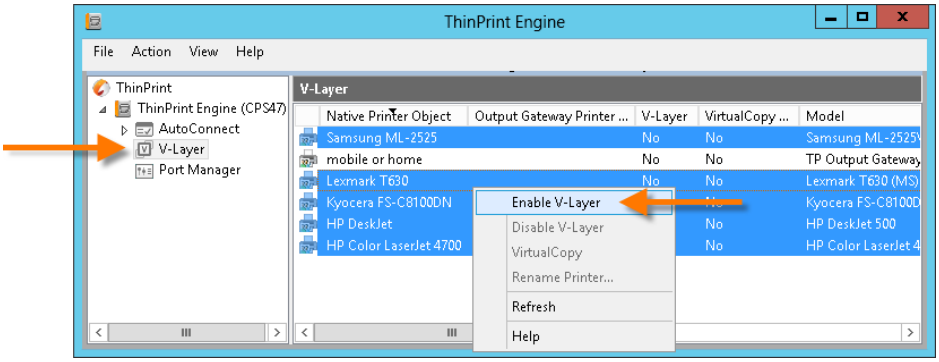


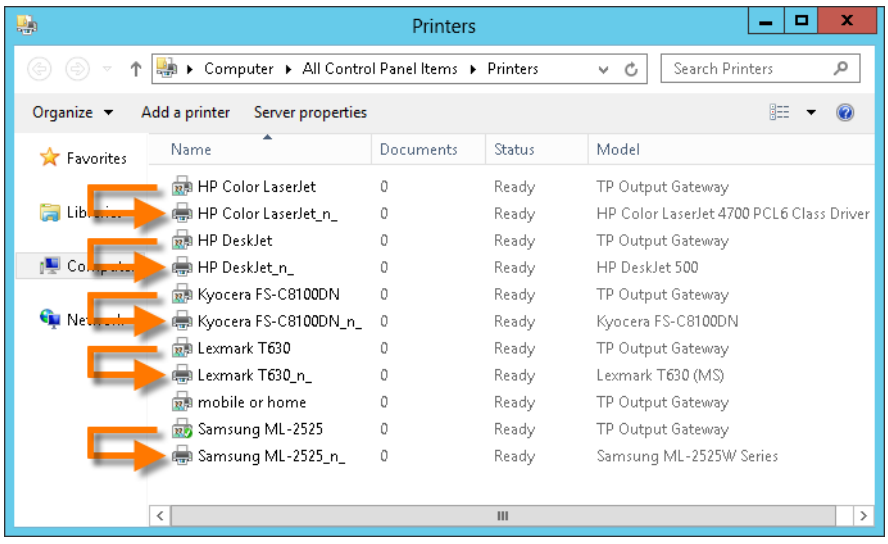
Illus. 142 Case 3: Create a printer with native driver for each printer model

V-Layer (case 3 only)

12. If you created printers with native drivers (case 3), switch to V-LAYER in the console tree. For each printer with a native driver, select ENABLE V-LAYER (Illus. 143). The result is shown in Illus. 144.



Illus. 143 Enable V-Layer for all printers with native driver


Printers
Computer ▸ All Control Panel Items ▸ Printers
Search Printers
Organize
Add a printer
Server properties
Favorites
Name
Documents
Status
Model
HP Color LaserJet 0 Ready TP Output Gateway
HP Color LaserJet_n_ 0 Ready HP Color LaserJet 4700 PCL6 Class Driver
HP DeskJet 0 Ready TP Output Gateway
HP DeskJet_n_ 0 Ready HP DeskJet 500
Kyocera FS-C8100DN 0 Ready TP Output Gateway
Kyocera FS-C8100DN_n_ 0 Ready Kyocera FS-C8100DN
Lexmark T630 0 Ready TP Output Gateway
Lexmark T630_n_ 0 Ready Lexmark T630 (MS)
mobile or home 0 Ready TP Output Gateway
Samsung ML-2525 0 Ready TP Output Gateway
Samsung ML-2525_n_ 0 Ready Samsung ML-2525W Series

Illus. 144 V-Layer printer pairs on the central print server

Configuring Auto-Connect

Because, in this scenario, ThinPrint Engine sends the print jobs to printers installed locally, either on the workstations or on thin clients (Illus. 137), the ThinPrint Client

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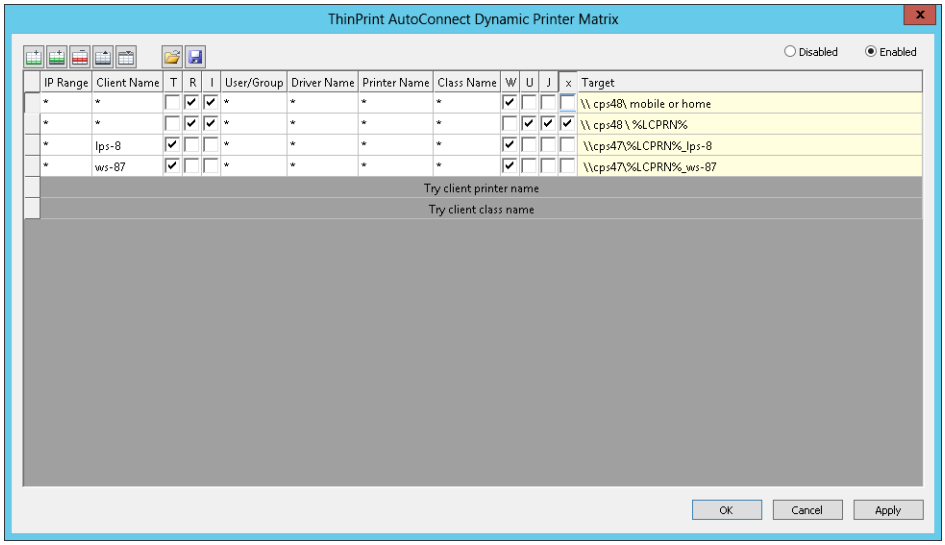
is installed on those. Therefore, printer mapping is carried out there by AutoConnect's **Dynamic Printer Matrix**. Proceed as follows:

1. Go to *Dynamic Printer Matrix* on the Active Directory server, on the terminal server, or on the virtual or physical desktop (Page 63).
2. Add one or more row(s) with the following content in the TARGET column (Illus. 145):

   *server_address**share_name*, here:
   \\cps47\mobile or home
   \\cps47\%LCPRN%



Illus. 145 Active Directory: Dynamic Printer Matrix

   Choose mapping rules so that for each client or user, only one row will match – here **R** (RDP) and **I** (ICA) for the ThinPrint Client type (in other words: printing via Virtual Channel Gateway), as well as **W** (Windows), and **U** (Unix/Linux), **J** (Java), and **x** (Mac OS or other) for the client machine's OS.
   Click OK to close Dynamic Printer Matrix.
3. Perform an update of the group policy for the terminal servers and/or virtual desktops.

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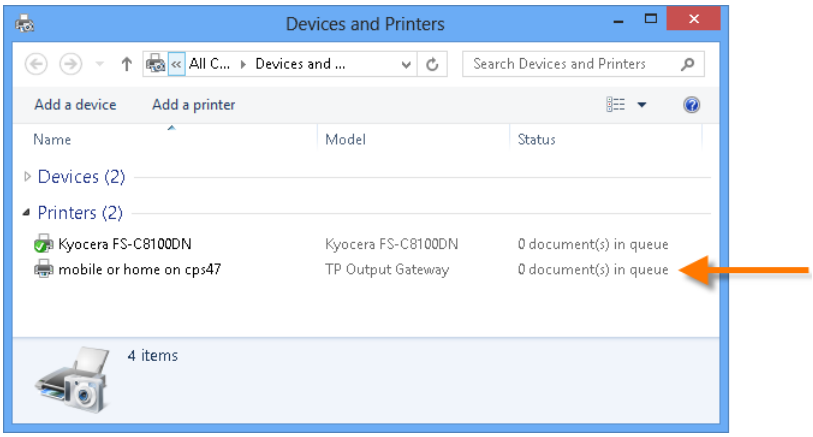
4. Start a session on the terminal server or virtual desktop, and perform test prints on the automatically mapped printers (Illus. 146).



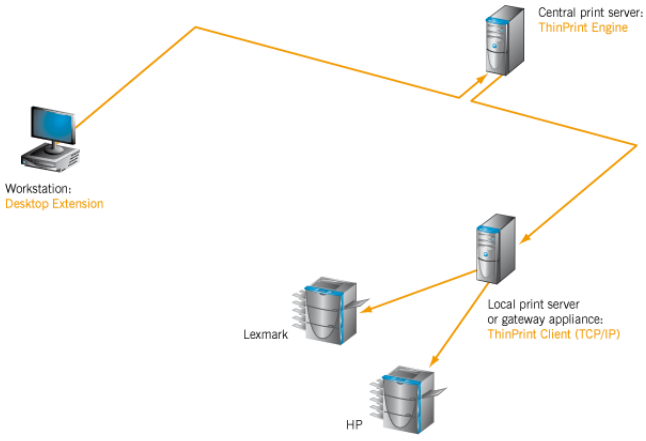
Illus. 146 Printer in a session mapped by AutoConnect (example for case 1)

Running applications on workstations

Network printers

Preconditions (see Illus. 147)

- **ThinPrint Engine** is installed on the central print server
- Installed on the local print server are:
  - **Printers**
  - **ThinPrint Client Windows (TCP/IP type)**
- **Desktop Extension** is installed on the Windows workstations



Illus. 147 Print data route: Workstation→ central print server→ local print server→ printer

Procedure

The installation procedure is the same as for network printers in *Running applications on terminal servers or virtual desktops* (Page 95). In this case, however, the group policies don't relate to the terminal servers or virtual desktops, but to the workstations. And finally, AutoConnect will be started with the same script when logging *on to the workstation*.

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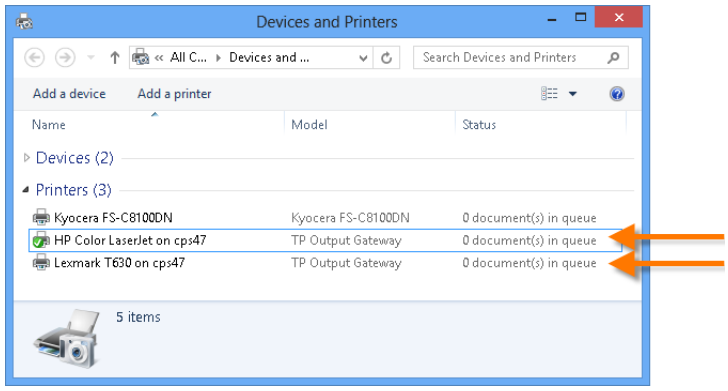
– Log on locally to a workstation, and perform test prints on the automatically created printers (Illus. 148).

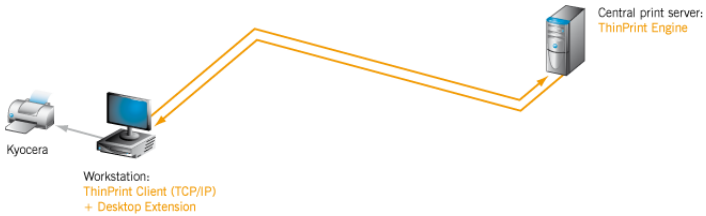


Illus. 148 Printers mapped on workstation by AutoConnect

Printers attached locally on workstations

Preconditions (see Illus. 149)

- ThinPrint Engine is installed on the central print server
- Installed on the Windows workstation are:
  - Printers
  - ThinPrint Client (TCP/IP type)
  - Desktop Extension



Illus. 149 Print data route: workstation⟶ central print server⟶ workstation⟶ printer

Procedure

The installation procedure is the same as for *Printers connected locally to workstations or thin clients* in section *Running applications on terminal servers or virtual desktops* (Page 103).

However, in this case, AutoConnect needs to be started script-controlled on the workstation, as follows:

1. Create logon scripts for all users – with the following content:

```
c:
cd C:\Program Files\Common Files\ThinPrint\
tpautoconnect -d
tpautoconnect -a %computername%
```

2. Perform an update of the group policy for the workstation.

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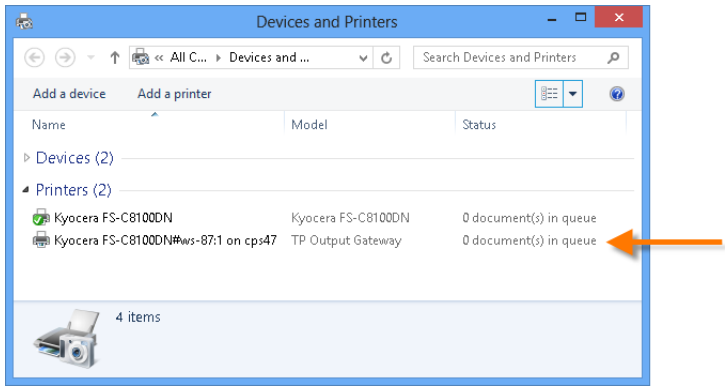
3. Log on locally on the workstation, and perform test prints on the automatically created printer (Illus. 150).



Illus. 150 Printer on the workstation connected by AutoConnect

Appendix

Customer service and technical support

www.thinprint.com/⟶ RESOURCES & SUPPORT
www.thinprint.com/en-us/resourcessupport/supportrequest.aspx

If you still can't print • Checklist

If AutoConnect does not create the desired printers or if printing itself fails to work properly, check the following before contacting ThinPrint support.

- The Windows Event Viewer shows the message "No valid license found".
  - On the license server, verify that the License Manager shows a valid license key. See *Entering license keys* in the License Server manual.
  - In the Cortado Management Console, verify that the user who has printed is ThinPrint enabled. See *Assigning a license to a user* in the License Server manual.
  - Verify that the ThinPrint Engine machine can connect to the *License Server* using the address and TCP port specified there.
  - On the license server, delete the local user group *ThinPrint Excluded Users*. See *Excluding users* in the License Server manual.
- If printers aren't connected automatically from the central print server to the session, make sure that:
  - TP AUTOCONNECT SERVICE is running on the same machine on which the applications run (i.e., each terminal server or desktop)
  - AutoConnect is properly configured (see below)
- If you can't print with ThinPrint at all, first make sure that:
  - there are enough valid user licenses available on the license server
  - the Print Spooler service is running on the print server
  - TP VC GATEWAY SERVICE is running on the same machine on which the applications run (i.e., each terminal server or desktop)

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- If print jobs don't arrive at the right printer, check whether:
  - the ThinPrint components on the machine where the applications run are out of date. Use the Terminal Server Extension or Desktop Extension to perform an update of these components (i.e., Output Gateway, AutoConnect, Virtual Channel Gateway).
- Is the same protocol selected for the ThinPrint Client, the ThinPrint Port, and AutoConnect? **Example for RDP:**
  - Is the RDP type of the ThinPrint Client installed on the client machine?
  - To which type of ThinPrint Port is the printer for this ThinPrint Client connected? USE VIRTUAL CHANNEL GATEWAY must be selected in the port configuration of the ThinPrint Engine console on the central print sever.
  - For AutoConnect, either VIRTUAL CHANNEL (ICA OR RDP) or AUTO must be set as connection protocol (Illus. 84). The respective column in Dynamic Printer Matrix has to be set to enabled (here R for RDP).
- If you configured AutoConnect using Group Policies (GPOs) in the Active Directory (Page 62) ...
  - Perform a Group Policy update in a session (`gpupdate /force`).
  - After performing the Group Policy update, check whether the following value exists in the Windows registry, and whether its data matches with the Dynamic Printer Matrix entries:

    hkey_local_machine\software\policies\thinprint\tpautoconnect**NameTranslationEx2**
- If **USE VIRTUAL CHANNEL GATEWAY** is selected in the central print server's port configuration (see above), please also check the following:
  - Is/are the IP address(es) of the central print server(s) entered in Virtual Channel Gateway configuration on the terminal servers (in the case of failover clusters those of all cluster nodes)?
  - Are the TCP port numbers the same for the ThinPrint Port and the Virtual Channel Gateway?
- If **TCP/IP** is the selected protocol:
  - Are the port numbers the same on both the server and client? (see port configuration of the ThinPrint Engine console on the central print server (Illus. 22) and in ThinPrint Client Manager)?
  - Are you sure that the TCP port number is not being blocked by the firewall or by another program?
  - Is the client machine in a masked network (NAT)? If so, you must either select RDP, ICA or PCoIP (and on the client-side use the respective ThinPrint Client[28]), or additionally, install the ThinPrint Connection Service (see also the ThinPrint Connection Service manual).
- If a printer was created manually, check the naming convention of the ThinPrint Port (see port configuration of the ThinPrint Engine console on the central print server and see Illus. 23).
- If you selected USE ENCRYPTION on the server (Illus. 22), read the section *Encryption of print data* for further information (Page 55), or disable encryption for now.

28 PCoIP is supported by the ThinPrint Clients embedded in VMware Horizon View Clients

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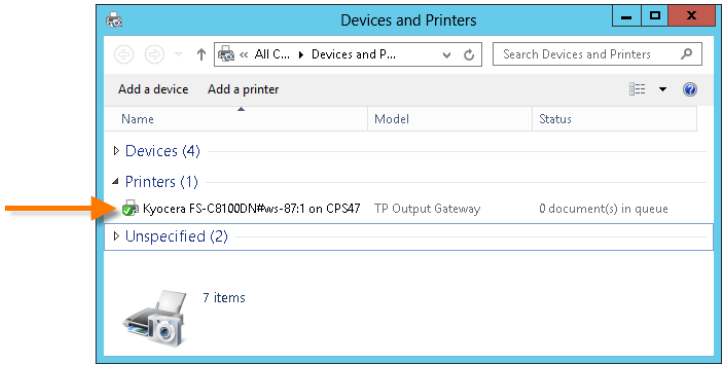
- If AutoConnect doesn't install printers, manually establish a once only printer connection (as Administrator) from the terminal server or desktop to a shared Output Gateway printer on the central print server. The resulting printer connection (Illus. 151) can be deleted afterwards.



Illus. 151 Connection to an Output Gateway share on the central print server (example)

- When AutoConnect starts (on a terminal server or virtual desktop), are the correct shares on the central print server connected? The entries in Dynamic Printer Matrix and Map Additional Printers table must refer to the printer shares. Check that AutoConnect is working by starting it manually: open the command prompt in a session and enter – in C:\Program Files\Common Files\ThinPrint\ – the following to create the session printers:

  ```
  tpautoconnect -v [-i VMware -a COM1]
  ```

  - If the session printers are able to be created manually, by entering `TPAutoConnect` in the command line, but are not automatically created when the session is started, check all AutoConnect settings.
- VMware Horizon View: If `tpautoconnect -v` returns the message `No suitable client protocol found`:
  - check whether the session was started using a View Client or using a Windows RDP Client (in the case of the Remote Desktop Connection, the RDP type of ThinPrint Client Windows must have been installed beforehand)
  - if you are using VMware Tools, update to version 9.2.2 (or later) or, if using a View Agent, update to version 5.1.2 (or later).
- **Testing the TCP/IP connection:** For printing via TCP/IP, there must exist, between server and client, a TCP/IP connection which allows direct communication between the ThinPrint Client and its TCP port (a TCP/IP type ThinPrint Client is necessary on the relevant client machine). Firewalls or masked client networks (NAT) can often cause difficulties in this situation. Test to see if the connection exists by trying a **telnet** from the server to the client's TCP port. To do this, enter the following at the server's command prompt:

  `telnet` *IP_address tcp_port*

  (See also the ThinPrint Client manuals.)

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Example 4: `telnet 192.168.131.224 4000`

After executing this command, a telnet window should open, **without error message**. If so, the connection is OK.

Perform the same test from the print server to the terminal server or virtual desktop, if the print jobs are to be delivered to the ThinPrint Client via ICA, RDP or PCoIP (actual Virtual Channel Gateway) instead of TCP/IP.
Additionally, check that the name resolution works properly (both lookup and reverse lookup) and translates the names into IPv4 addresses. If the DNS returns an IPv6 address, disable IPv6 on the target machine.

- If you used **variables** in the TARGET column of Dynamic Printer Matrix (e.g. \\cps05\%LCPRN%), check that the printer names on the client machine and the share names on the central print server are identical.
- **V-Layer** print jobs disappear on the central print server. To perform a test, pause both printer objects of a V-Layer. Then print from a session to the Output Gateway object. Select RESUME PRINTING for the Output Gateway object. If the print job arrives at the Output Gateway object and then disappears, perform the following steps:
  - Ensure that the Windows service TP V-LAYER is running on the central print server.
  - Share the respective native printer object. Alternatively, you can assign the permission MANAGE PRINTERS to the group EVERYONE.
  - For Windows Server 2008 **SP1** (x86 and x64): install **SP2 or,** the Microsoft hotfixes KB958741 (Print Job Owner) and KB958656 (Client Side Rendering) both on terminal servers and on the central print server (see Page 14).
  - Check that the Output Gateway driver version (at least on the central print server) is up to date.
  - For VMware Horizon View environments: update the ThinPrint components provided with View Agent to version 8.6 or 10, using Desktop Extension installer software (or manually).
- Incorrect characters or fonts in print output:
  - See the guide *Solving problems with fonts*.
- Although you enabled **ThinShare** (Page 21) your print jobs aren't compressed on the way to the central print server:
  - One of the messages "ThinShare is in active state, but print job is not compressed. Check Group Policy" or "ThinShare On, CSR On, Job is not compressed" can be found in the central print server's Event Viewer.
  - Check whether the version of ThinPrint's print processor TPWinPrn.dll is at least 9.4.538 (in C:\Windows\System32\spool\prtprocs\x64).
  - To update the print processor see Page 121.

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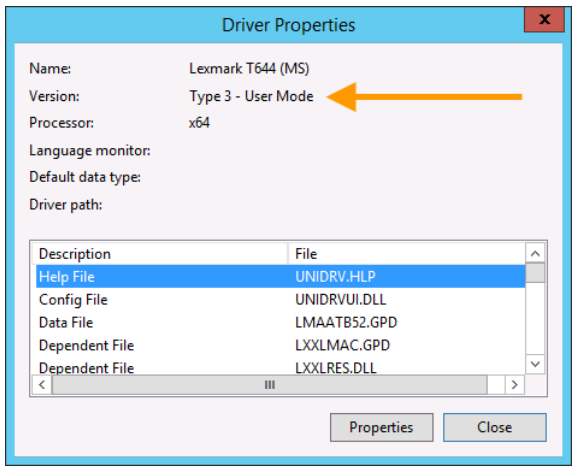
- If the **printer list** of ThinPrint Client **Service** Windows is **empty** after booting the operating system, it may be because the client started up more quickly than the Print Spooler. In this case, you can delay the **TP Client Service Windows** start up, using either the start type AUTOMATIC (DELAYED START) start type or using a script (start type: MANUAL):

```
ping 127.0.0.1 -n 30 >NUL
net start Thn32svc
```

- From Windows 2012 R2 typ-4 drivers can't be connected to third-party printer ports. That's why use type-3 drivers with ThinPrint Ports (Illus. 152).



Illus. 152 Example for a type-3 driver, here: *Lexmark T644 (MS)*

Windows registry

In the following you can find a selection of possibly relevant entries in the Windows registry.

ThinPrint Engine: ThinPrint Ports and ThinPrint Connection Service Ports

hkey_local_machine\system\CurrentControlSet\Control\Print\Monitors\ThinPrint Port\<port name>:

Name	ThinPrint Engine MMC	Description	Type	Default value
Bandwidth	BANDWIDTH (KBIT/S (KBPS))	Bandwidth used to send print data (in bit/s, bits per second)	reg_dword	256000
Bandwidth-Access	CLIENT CONTROL: BANDWIDTH	Enables the ThinPrint Client to reduce the bandwidth 0 = disabled; 1 = enabled	reg_dword	0
Bandwidth-CtrlEnabled	BANDWIDTH CONTROL: ENABLE	Enables bandwidth control 0 = disabled; 1 = enabled	reg_dword	0

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Name	ThinPrint Engine MMC	Description	Type	Default value
CConnTries	Connection retries	Number of attempts to establish a connection to the ThinPrint Client, Connection Service or Virtual Channel Gateway	reg_dword	3
CLevel	Bandwidth control: Enable + Minimum print data volume	Compression level 0 = no compression 5 = default compression 8 = high compression (Bandwidth control enabled) 9 = best compression (Minimum print data volume enabled)	reg_dword	5
DeleteErrJobs	—	Print job handling when ThinPrint Client doesn't take them 1 = failed jobs will be deleted 0 = failed jobs will be left in the printer queue (Queue Manager)	reg_dword	1
Host	— ; Connection Service address	With ThinPrint Ports: ThinPrint Client address; with ThinPrint Connection Service Ports: Connection Service address	reg_sz	—
IsCSvcPort	New ThinPrint Port/New ThinPrint Connection Service Port	0 = ThinPrint Engine doesn't print to the Connection Service 1 = ThinPrint Engine prints to the Connection Service	reg_dword	—
IsVCGPort	Use Virtual Channel Gateway	0 = ThinPrint Engine doesn't print to Virtual Channel Gateways 1 = ThinPrint Engine prints to Virtual Channel Gateways	reg_dword	0
NetSend	Net send service	Inform the users about errors? 0 = no 1 = yes	reg_dword	1
Port	TCP port	TCP port for communication to ThinPrint Clients, Virtual Channel Gateway or Connection Service	reg_dword	4000
SignCert	—	Name of certificate that signed the client certificate. Overrides global SignCert setting in hkey_local_machine\system\currentcontrolset\control\print\monitors\ThinPrint Port\	reg_sz	—

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Name	ThinPrint Engine MMC	Description	Type	Default value
UseEncryption	USE ENCRYPTION	0 = encryption disabled 1 = encryption enabled	reg_dword	0
WTSMsgBox	—	If set to 1 and an error occurred: A message box will be sent to the terminal server session which started the print job.	reg_dword	1

AutoConnect

hkey_local_machine\software\ThinPrint\TPAutoConnect

Name	AutoConnect MMC	Description	Type	Default value
ConnectTo-Client	PRINTER NAME CONTAINS PREFERABLY (PRINTING VIA TCP/IP)	Connection to client with client name or client address (use: Auto, ClientName, ClientAddress)	reg_sz	Auto
DisableSetting-OfDefPrinter	AUTOCONNECT HAS NO INFLUENCE	AutoConnect will not set any default printer	reg_dword	0
InstallOrder	1, 2: DEFAULT PRINTER TAKEN FROM 4: DISABLE DYNAMIC PRINTER MATRIX	0 = create/connect no printer 1 = Dynamic Printer Matrix first 2 = Map Additional Printers first 3 = Dynamic Printer Matrix only 4 = Map Additional Printers only	reg_dword	1
ListenToWTS	—	AutoConnect is started automatically on session logon (Auto mode)	reg_dword	1
ListenToWTS-CreatCmd	—	Command that will be launched on session logon if ListenToWTS is not 0	reg_sz	tpauto-connect.exe
ListenToWTS-DeleteCmd	—	Command that will be launched on session logoff	reg_sz	tpauto-connect.exe -dl
ListenToWTS-OnDisconnect	AT SESSION RECONNECT/DISCONNECT	Indicates whether printers will be deleted when a session goes to the disconnect state	reg_dword	1
NameTrans-lationEx	DYNAMIC PRINTER MATRIX	Content of Dynamic Printer Matrix	reg_multi_sz	—

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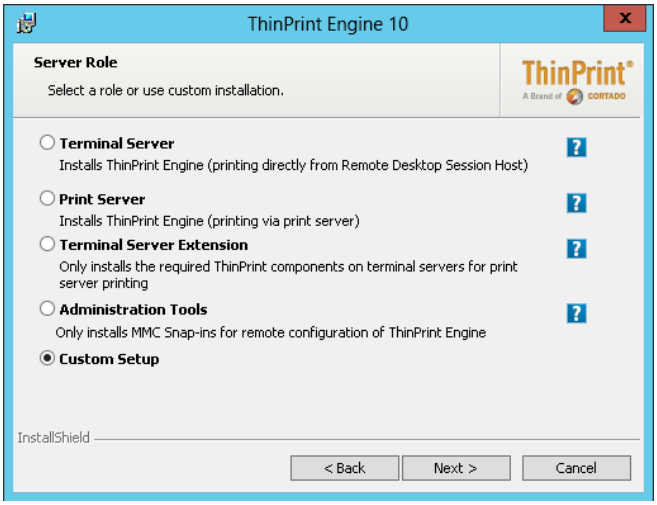
Name	AutoConnect MMC	Description	Type	Default value
PrinterCreate-ListEx2	MAP ADDITIONAL PRINTERS	Content of Map Additional Printers	reg_multi_sz	—
Protocol	TRANSFER PROTOCOL	Protocol for connections to ThinPrint Clients (use: TCPIP, VC, AUTO)	reg_sz	AUTO
UserDriven-DefaultPrinter	DEFAULT PRINTER – GIVE PRIORITY TO THE USER'S CHOICE	Set to 1 if the selection of the default printer will be user driven, so AutoConnect will not interfere it	reg_dword	0

Server roles and custom setup

Selecting a server role (Illus. 153) leads to the installation options listed below:


ThinPrint Engine 10
Server Role
Select a role or use custom installation.
ThinPrint
A Brand of CORTADO
Terminal Server
Installs ThinPrint Engine (printing directly from Remote Desktop Session Host)
Print Server
Installs ThinPrint Engine (printing via print server)
Terminal Server Extension
Only installs the required ThinPrint components on terminal servers for print server printing
Administration Tools
Only installs MMC Snap-ins for remote configuration of ThinPrint Engine
Custom Setup
InstallShield
< Back
Next >
Cancel

Illus. 153 Select a server role or the CUSTOM SETUP

Server role	Installation options
TERMINAL SERVER	Print Controller (= ThinPrint Engine) incl. Tracking Service, Cloud Printing, Output Gateway, Output Gateway PS, AutoConnect, Virtual Channel Gateway, Session in Session, Administration Tools (= MMC components) and Client for License Server
PRINT SERVER	Print Controller incl. Tracking Service, Cloud Printing, Output Gateway, AutoConnect, Administration Tools and Client for License Server
TERMINAL SERVER EXTENSION	Output Gateway, Session-in-Session, AutoConnect and Virtual Channel Gateway

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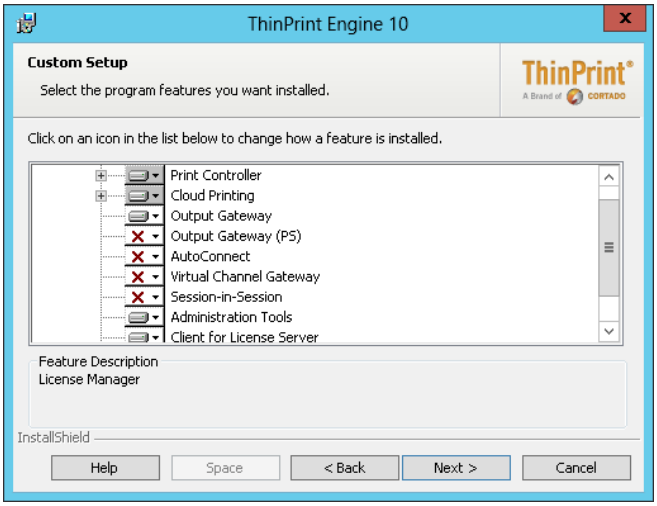
Server role	Installation options
ADMINISTRATION TOOLS	MMC components only
CUSTOM SETUP	Free choice of component

Custom installation

Here you can specifically select and install individual ThinPrint components (Illus. 154). The following components can be selected:

- **Print Controller** (= ThinPrint Engine)
  - Tracking Service, see Page 18
  - V-Layer Service
- Cloud printing, see Page 89
  - Cloud Printer
  - Print-to-ePaper
- **ThinPrint Output Gateway**, see Page 38
- **ThinPrint Output Gateway PS** (native driver for printing to non-Windows clients)
- **AutoConnect**, see Page 61
- **Virtual Channel Gateway**, see Page 85
- **Session-in-Session** (see *ThinPrint Engine on terminal servers* manual)
- **Administration Tools** (ThinPrint MMC component to remotely configure – from this computer – another one with ThinPrint components installed on it, can be installed on both workstations and servers)
- **License Manager** (License Server component for managing the license keys)

- **Client for License Server** (component for connecting the Print Controllers to the License Server)



Illus. 154 CUSTOM SETUP options

Update and uninstallation

Update order

1. ThinPrint components on central print servers

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2. ThinPrint components on terminal servers, virtual desktops and workstations

Update from ThinPrint version 9.0 to 10.0 or from 9.0 to 10.6

To update to ThinPrint 10, proceed as follows:

1. Apply for new license keys in the Cortado Enterprise Portal (free of charge for customers with an update subscription): https://enterpriseportal.cortado.com
2. Install the License Server on a separate machine. This allows you to continue working with the old version until the new one is fully functional. Enter the new (ThinPrint 10) license keys there.
3. Perform an update of the ThinPrint Engine to version 10 and specify the license server.
4. Delete your old license keys and complete the letter of destruction, which you then send to ThinPrint or Cortado.
5. Activate your (new) licenses and activate your users/user groups for ThinPrint, see *Activating license keys* in the License Server manual.
6. Perform an update of the Terminal Server Extension to version 10.

Note! Make sure that no user sessions run during the Terminal Server Extension update.

Updating Output Gateway to ThinPrint version 10.0 or 10.6

After sharing printers the printer driver TP Output Gateway can be delivered automatically using Point and Print to terminal servers, virtual desktops and workstations. But with the printer driver update maybe the print processor isn't updated automatically by Windows if an older version already exists. In this case it's possible to print but ThinShare doesn't work – in other words: The print data won't be compressed on the way to the central print server.

To make sure to update ThinPrint's print processor (tpwinprn) there are two alternatives:

- Either you update the printer driver directly on the target machine using its driver package. This can be found on the central print server in the directory C:\Program Files\Common Files\ThinPrint\Virtual Printer\TPOG3
- Or you enable the group policy Point and Print Restrictions (Illus. 155) in the domain for all target machines including the option Do not show warning or evaluation prompt (Illus. 156).

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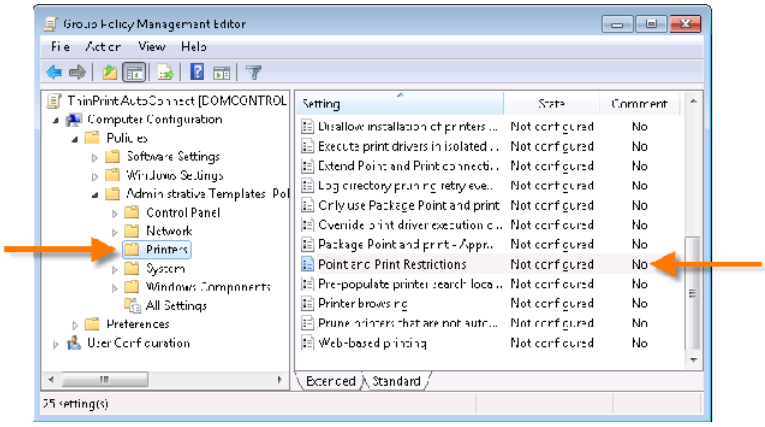
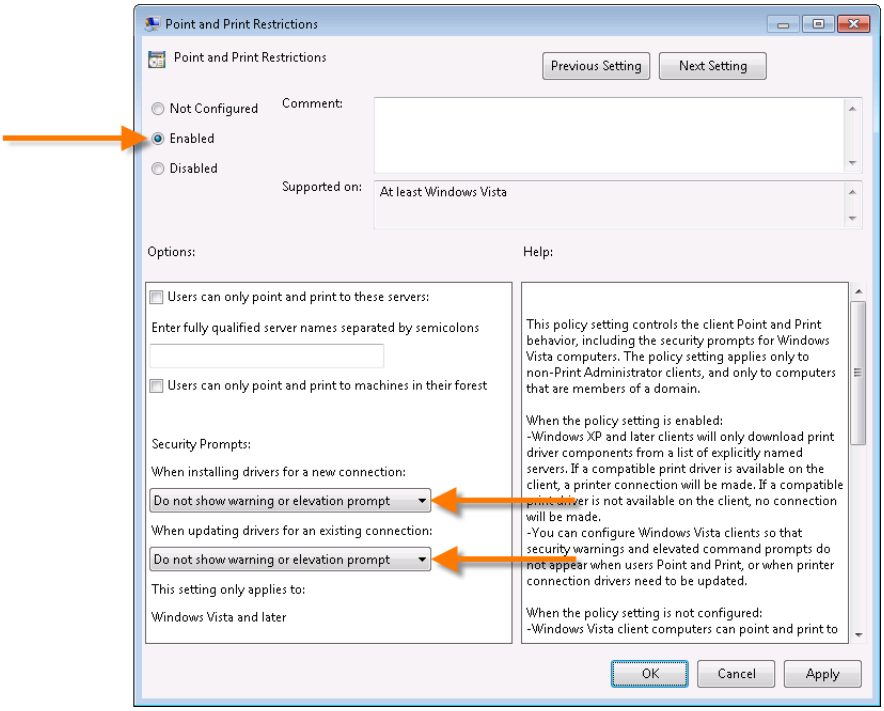


Illus. 155 GPO Point and Print Restrictions


Point and Print Restrictions
Point and Print Restrictions
Previous Setting
Next Setting
Not Configured
Enabled
Disabled
Comment:
Supported on:
At least Windows Vista
Options:
Help:
Users can only point and print to these servers:
Enter fully qualified server names separated by semicolons
Users can only point and print to machines in their forest
Security Prompts:
When installing drivers for a new connection:
Do not show warning or elevation prompt
When updating drivers for an existing connection:
Do not show warning or elevation prompt
This setting only applies to:
Windows Vista and later
This policy setting controls the client Point and Print behavior, including the security prompts for Windows Vista computers. The policy setting applies only to non-Print Administrator clients, and only to computers that are members of a domain.
When the policy setting is enabled:
-Windows XP and later clients will only download print driver components from a list of explicitly named servers. If a compatible print driver is available on the client, a printer connection will be made. If a compatible print driver is not available on the client, no connection will be made.
-You can configure Windows Vista clients so that security warnings and elevated command prompts do not appear when users Point and Print, or when printer connection drivers need to be updated.
When the policy setting is not configured:
-Windows Vista client computers can point and print to
OK
Cancel
Apply

Illus. 156 Enabling the GPO Point and Print Restrictions

Update from older ThinPrint versions

When you wish to retain your settings, perform the update step by step, e.g. from 8.0 to 8.6, then to 9.0, to 10.0 and last but not least to 10.6.

Update from ThinPrint version 7.6 FR1 to 8.0

If you have installed 7.6 FR1 (V-Layer), proceed as follows:

1. Disable all V-Layers (see Illus. 55 on Page 53)
2. Uninstall FR1
3. Install version 8.0 (uninstalling 7.6 is not necessary)
4. Re-enable all V-Layers

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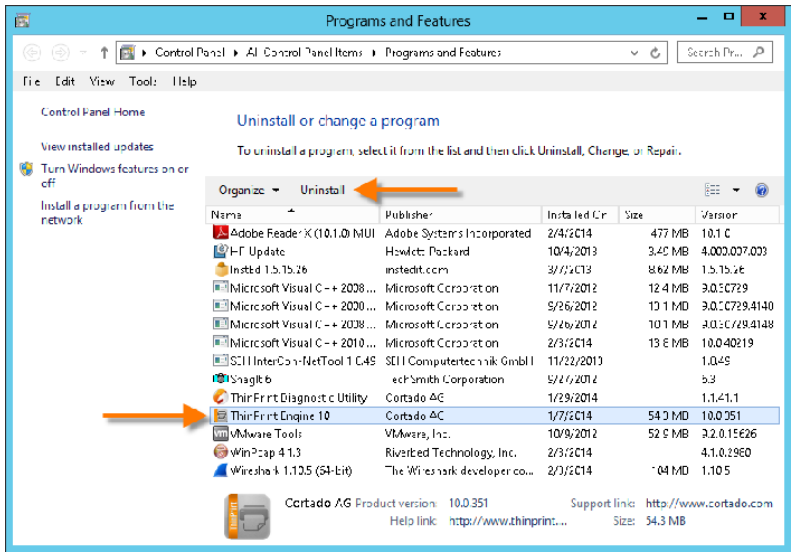
Uninstallation

To uninstall a ThinPrint component open PROGRAMS AND FEATURES in CONTROL PANEL. Mark the ThinPrint Engine and then select UNINSTALL (Illus. 157).



Illus. 157 Uninstalling ThinPrint Engine

Disabling Windows printer mapping

To simplify the selection of a ThinPrint printer within a session, the Windows automatic printer mapping function should be disabled within and outside of the session. To do so, configure the following on the terminal server:

Windows Server 2012

1. On the terminal server, go to ADMINISTRATIVE TOOLS, and open the REMOTE DESKTOP SERVICES folder

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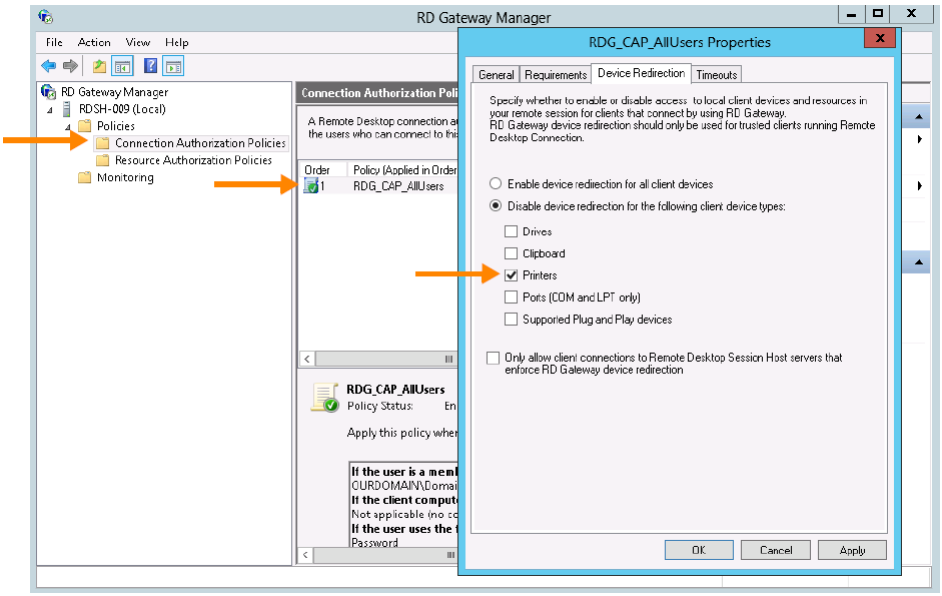
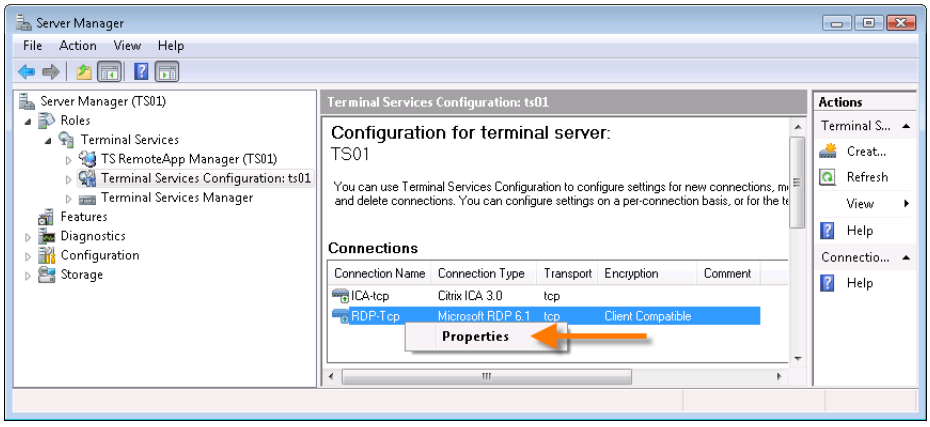
2. Select Remote Desktop Gateway Manager (Illus. 159)
3. Select Connection Authorization Policies
4. Click on the policy RDG_CAP_AllUsers and go to the Device Redirection tab. Place a checkmark at Printers while selecting Disable device redirection for the following client device types (right arrow in Illus. 159).


RD Gateway Manager
File Action View Help
RD Gateway Manager
RDSH-009 (Local)
Policies
Connection Authorization Policies
Resource Authorization Policies
Monitoring
Connection Authorization Poli
Order
Policy (Applied in Order
1
RDG_CAP_AllUsers
RDG_CAP_AllUsers Properties
General
Requirements
Device Redirection
Timeouts
Specify whether to enable or disable access to local client devices and resources in your remote session for clients that connect by using RD Gateway. RD Gateway device redirection should only be used for trusted clients running Remote Desktop Connection.
Enable device redirection for all client devices
Disable device redirecton for the following client device types:
Drives
Clipboard
Printers
Ports (COM and LPT only)
Supported Plug and Play devices
Only allow client connections to Remote Desktop Session Host servers that enforce RD Gateway device redirection
OK
Cancel
Apply

Illus. 158 Disable Windows printer mapping using a policy (Windows Server 2012)

Windows Server 2003 and 2008

1. In Windows Control Panel, select Administrative Tools⟶ Server Manager⟶ Roles⟶ Terminal Services Configuration (Windows Server 2008) or Administrative Tools⟶ Terminal Services Configuration (Windows Server 2003).
2. Click on the RDP-TCP connection and select Properties in the context menu (Illus. 159)
3. Disable the mapping functions (arrows in Illus. 160). Click OK to confirm.



Illus. 159 Opening RDP configuration

4. If available, click on the ICA-TCP connection and select Properties in the context menu. Disable the mapping functions. Click OK to confirm.

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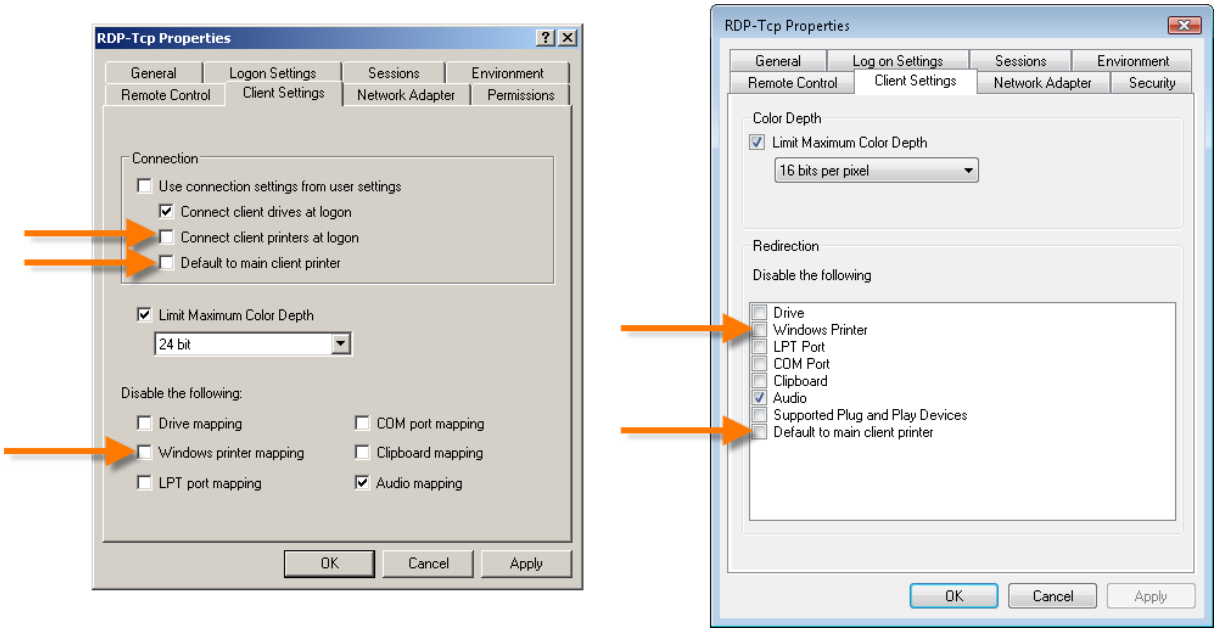
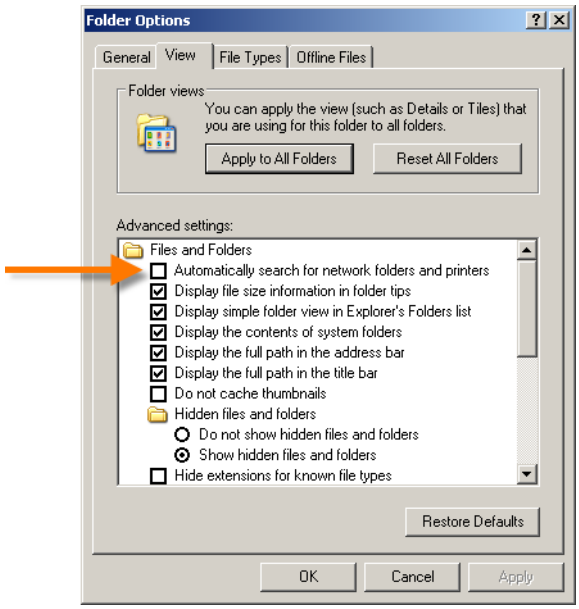


Illus. 160 Session settings for printer mapping (Windows Server 2003 and 2008)

Windows Server 2003 only

1. In Windows Explorer, select TOOLS⟶ FOLDER OPTIONS⟶ VIEW.
2. Disable the AUTOMATICALLY SEARCH FOR NETWORK FOLDERS AND PRINTERS function (Illus. 161). Click OK to confirm.


Folder Options
General
View
File Types
Offline Files
Folder views
You can apply the view (such as Details or Tiles) that you are using for this folder to all folders.
Apply to All Folders
Reset All Folders
Advanced settings:
Files and Folders
Automatically search for network folders and printers
Display file size information in folder tips
Display simple folder view in Explorer's Folders list
Display the contents of system folders
Display the full path in the address bar
Display the full path in the title bar
Do not cache thumbnails
Hidden files and folders
Do not show hidden files and folders
Show hidden files and folders
Hide extensions for known file types
Restore Defaults
OK
Cancel
Apply

Illus. 161 Explorer settings for printer mapping (Windows Server 2003)

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Additional resources

Further information about ThinPrint can be downloaded from our website.

Manuals and descriptions

The following manuals and further technical information are – amongst other – available at www.thinprint.com/manuals:

- ThinPrint Engine on print servers • Quick installation
- Licensing
- License Server
- Desktop Extension
- ThinPrint Tracking
- ThinPrint Management Center
- ThinPrint Connection Service
- ThinPrint Engine on terminal servers
- Unattended installation of ThinPrint Engine components
- Solving problems with fonts
- Tips for configuring ThinPrint
- ThinPrint addressing
- ThinPrint Ports
- ThinPrint Port configuration for bandwidth controlled printing via LPR/LPD
- Microsoft Failover Clusters and ThinPrint
- Creating SSL/TLS certificates for printing with ThinPrint
- Windows machine as a Client Gateway
- SEH ISD as a Client Gateway
- SEH TPG as a Client Gateway
- Preconfiguration and unattended installation of ThinPrint Client Windows
- further ThinPrint Client manuals

Cortado manuals

The following manuals are available at www.cortado.com/→ SUPPORT→ GUIDES & MANUALS:

- Cortado Corporate Server: Installation and initial setup
- Cortado Corporate Server: Configuration and maintenance

Thin clients and gateways

Thin Clients with an embedded ThinPrint Client, as well as ThinPrint gateway appliances can also be found at www.thinprint.com as well as terminals with the embedded ICA/RDP type of ThinPrint Client.

Software downloads

The current version of **ThinPrint Engine**, can be downloaded at: www.thinprint.com/demo.

ThinPrint Clients as well as tools like **Finishing Detector** and **ThinPrint Preview** (TPView.exe) can also be found at www.thinprint.com.

Glossary

Activation key

Entering the activation key in License Manager enables unlimited application of the ThinPrint software. An activation key is obtained by submitting license and registration keys to ThinPrint GmbH.

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AutoConnect — ThinPrint component for automatic connection to printer shares of print servers; it can be run on any Windows machine.

Bandwidth — The capacity of a network or data connection for digital transmission, usually measured in bit/second (bit/s, bits/sec, or bps) or in Kilo-bit/ second (kbit/s, kbits/sec, or kbps).

Bandwidth control — A *ThinPrint Port* regulates bandwidth for print jobs. Because bandwidth is controlled separately per printer port and can be set individually, optimal performance can be achieved with the following ThinPrint settings:

- Number of ThinPrint Ports
- Different bandwidth settings for each ThinPrint Port
- Assignment of printers to ThinPrint Ports

Class — see *Printer Class*

Client — The term client signifies a device which connects to, requests data from, and/or starts an application on, a server. It receives, for example, print data from the server and forwards it to a printer. Typical clients are: workstations, notebooks, thin clients, print servers, gateway appliances and network printers.

Client Gateway — see *Gateways*

COM — Component Object Model; fundamental communication model for icon communication under Windows.

Compression — In addition to bandwidth control, ThinPrint compresses print data. Typical compression rates for PCL and Postscript printer drivers lie somewhere between 55% and 95% – depending on printer driver, application, and type of data (e.g.: pixel/vector fonts, pixel/vector graphics). With Driver Free Printing there are four available compression options (normal, optimal, maximum and extreme). Nonetheless, when printing with either Driver Free Printing, or with the native printer driver, a higher or lower compression may be chosen without compromising the print quality (Page 25).

Connected Gateway — see *Connection Service*

Connection Service — Connection Service enables printing to ThinPrint Clients that are hidden behind Network Address Translation (NAT). But in contrast to Virtual Channel Gateway the print data is sent over pure TCP/IP and not via an RDP, ICA or PCoIP channel.

ThinPrint Engine sends all print jobs to the Connection Service, which passes them on to the ThinPrint Clients. No IP addresses are used for addressing the ThinPrint Clients, but rather a ThinPrint specific Client ID. This Client ID is created in ThinPrint Client.

Current printer — A setting in the ThinPrint Client Manager: A document is printed with the current printer if a client has only *one* printer, or if the printer can't be determined by *ID*. Current printer can also be used to set the default printer at the server when using AutoConnect (with the option DEFAULT AT SERVER).

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Data type

Several types are usually supported for printing using Windows. The two most commonly used – expanded metafile (EMF) and print-ready (RAW) – affect performance on both client and print server machines differently. See also *EMF*

Dedicated print server

A served "dedicated" to a single task: printing. A terminal server, virtual desktop or workstation does not send print data directly to clients, but to central, dedicated print servers. There it is rendered, and then sent to the clients or printers. (see also *Print server*)

Device

Here: thin client, print server, printer (print device), gateway/print appliance or print server (print box)

EMF

EMF (enhanced metafile) is the default data type for most Windows programs. Unlike those in RAW format, printed documents in EMF are converted to metafile format.

With Driver Free Printing, EMF files are smaller than RAW files containing the same print job. In server-based computing, only the first half of a print job is generated on the terminal server or virtual desktop (for the sake of system performance). The main work is performed by the client machine, thus improving the terminal server's or virtual desktop's performance. See also *Data type*

Encryption

see *SSL*

Gateways

ThinPrint uses the following kinds of gateways:

1. ThinPrint Output Gateway: ThinPrint's virtual printer driver
2. Virtual Channel Gateway: With our Virtual Channel Gateway, we actually put print data coming from a print server into the RDP, ICA or PCoIP virtual channel and send it directly to the client.
3. ThinPrint Client Gateway: Local print server with installed ThinPrint Client

ICA

Independent Computing Architecture (from Citrix); network protocol for communication between Windows terminal servers (or virtual desktops) and ICA clients.

ICA is a 3-part technology for server-based computing, that separates application logic from the user interface, and allows the application to run entirely on the server.

ICA requires Citrix XenApp on the server; XenApp requires Microsoft Terminal Services.

IP masking

see *Network Address Translation*

License key

All ThinPrint software requires a license key. The key has the format: THxx-xxxx-x-xxxxxx-xxxx (32 bit) or TAxx-xxxx-x-xxxxxx-xxxx (64 bit). License Manager uses the license key to generate a registration key according to system configuration. Both the license key and the registration key are required to request the activation key.

Local resources

Local in this sense means available to or installed upon the selected computer. Client operating systems always search first for a local printer driver. Thus, when printing on the client side, the printer driver is first sought on the client computer, and only if necessary, is a driver downloaded from the server.

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LPD client	An LPD client is a network end device that supports the Line Printer Daemon (LPD); e.g., an internal or external print server of a network printer, or a Linux terminal. It is also possible to print with ThinPrint to LPD devices, even if there is no ThinPrint Client available there. Although compression cannot be used, bandwidth control is available to improve printing in this environment.
LPD filter	An LPD filter is run on LPD clients to decompress print jobs which have been processed by ThinPrint.
LPR	Line Printer Remote; Program for issuing a print job (client component of LPD)
Network Address Translation (NAT)	Multiple private addresses are transformed into a single public IP address. This lets several workstations in a LAN use the IP address for Internet access, while the LAN hides behind the router's IP address, as registered in the Internet.
Output Gateway	see *Gateways*
Port pooling	s. the section *Port pooling* (Page 36)
Print device	Contrary to popular nomenclature, hardware which produces printed material is called a print device and NOT a printer. Print resolution is measured in DPI (Dots Per Inch). The higher the DPI value, the better the resolution. See also *Printer*
Printer	The point of interface between operating system and print device is called the printer. In Windows architecture alone, many possible terms exist: logical printer, printer software, or printer object. Printer settings include, among other, the designation of a connection (i.e., LPT1 or ThinPort), the printer driver (this is normally included by the manufacturer), authorization of share names, etc. In Windows, every printer is represented in the printers folder or in the Print Management by an icon with an obvious name. There is generally not a one-to-one relationship between printer and print devices. Several printers for a single print device, for example, signify that either the print device is connected to several computers, or that many printers have been set up on a computer, with different parameters for the same print device. For better understanding, this description only distinguishes between printers, printer objects, and print devices when the specific context makes it necessary.
Printer class	Printers whose drivers are compatible can be grouped in a class. For example, many laser printers are compatible with HP LaserJet (class could be: *HPLaser*). Only *one* entry in Dynamic Printer Matrix of AutoConnect is necessary for all printers in a class.
Printer driver	Printer drivers are programs which enable communication between client applications and print devices. Each print device requires unambiguous commands which are specific to that device, to employ such print functions as color, margin, format, etc. An operating system comprehends these individual commands for specific print devices through the printer driver.
Printer object	In Windows: a printer created in the printers folder or in the Print Management.
Printer pool	see *Port pooling*

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Printer queue	The list of documents which are ready to be printed from a particular print device, and/or are waiting for processing, is referred to, in Windows terminology, as the printer queue. Under NetWare and OS/2, the term *printer queue* is synonymous with *printer*.
Printer software	Printer software is the commonly used name for *logical printer* or *printer*.
Print job	Print jobs are composed of a source code in the language of the relevant printer. This source code contains both print data, such as a text or picture, and print device commands such as form feed or page format.
Print server	A print server is hardware which connects print devices with a network. The print server is thus responsible for the printer queues of connected print devices. A print server can also be a specific hardware device that exclusively embodies the network connection, plus a serial or parallel connection (print appliance/external print server/print box). A print server can also be pre-integrated within a printer, so that separate hardware is unnecessary and the print device can be directly connected with the network (internal or onboard print server). (Illus. 1; see also *Dedicated print server*)
Print server services	Print server services is the term for the print server software that handles communication with non-Windows clients. Because a print job from a UNIX client is different than one from a Macintosh client, there are different print server services. These can, for instance, change the parameter for data type, as needed.
Print spooler	see *Spooler*
Queue	see *Printer queue*
RDP	Remote Desktop Protocol; communication protocol between Remote Desktop Session Hosts or virtual desktops and clients, in a Windows operating system. The name of the service is *Terminal Services*, and the connection type in Windows is called *Remote Desktop Connection*.
Remote Desktop Connection	see *RDP*
Remote Desktop Services	see *Terminal Services*
Remote Desktop Session Host	see *Terminal server*
Rendering	A printer driver is used to translate a print job into printer-specific format.
Server based Computing	A server-centric system for facilitating user access to applications. Application logic is run on a server or virtual desktop, and only the user interface is transmitted through the network. See also *Terminal server*

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Session-in-Session	When printers are assigned by AutoConnect in a terminal session, they are still available if a further session is configured from a terminal server, onto another machine.
Spooler	Print spooler describes those programs or DLLs (Dynamic Link Libraries) which together, receive, process, temporarily save, chronologically sort, and distribute queued print jobs. With network printers, the spooler has a client component and a server component. The client component is normally found where the application is being run. The server component is generally where the print device is installed, for example, at the print server (Windows service denomination: Print Spooler).
Spooling	Simultaneous Peripheral Operations On-Line: Print jobs are temporarily stored as files on a hard disk. This procedure is known as spooling and is only one of the several functions of the spooler. Unspooling is the process of reading this file and sending it to the print device.
SSL	To establish a secure connection with SSL/TLS, the communication partners must first agree on the cryptographic methods and parameters to be used. Basically, SSL/TLS offers the options of key exchange, systematic encryption, and the calculation of a cryptographic proof sum. There are various methods that can be used for each of these options.
Terminal server	= Remote Desktop Session Host: a Windows server with Microsoft Terminal Services or Remote Desktop Services
Terminal Services	= Remote Desktop Services: a Windows service for remote desktop sessions
Thin client	A minimum performance computer with only elementary hardware and/or software components (no hard drive) In a server/client architecture, a client system on which no application programs are run. Instead, all applications are processed at the server.
ThinPrint Client	On the client side, *ThinPrint Client* is generally responsible for receiving print data, decompressing and decrypting it, and sending it to the print device. Many ThinPrint Clients are available for different end devices and areas of deployment: for all Windows versions, for Mac OS and Linux as well as for internal or external print servers of network printers.
ThinPrint Client Gateway	see *Gateways*
ThinPrint Client Service Windows	The Windows service version of ThinPrint Client is automatically started when a client machine is activated. Thus, it is not necessary for a user to be logged on for the Client Service Windows to function. This ThinPrint Client is therefore particularly well suited for local print servers under Windows (ThinPrint Client Gateways). ThinPrint Client Service Windows does not support print preview with Driver Free Printing.
ThinPrint Connection Service	see *Connection Service*

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ThinPrint Engine

The server component ThinPrint Engine is the actual core of the ThinPrint framework. It provides complete printer driver management, including Driver Free Printing. The ThinPrint Engine performs the following main functions:

- Bandwidth controlled transmission of print jobs
- Print data compression and streaming
- Print data SSL/TLS encryption
- Provides the virtual printer driver ThinPrint Output Gateway (enabling a radical reduction of printer drivers on printing computers = Driver Free Printing).

ThinPrint Output Gateway

see *Gateways*

ThinPrint Port

To print with ThinPrint, printers are linked to ThinPrint Ports on the machine that creates the print jobs. These printer ports are created and configured with the MMC.[29] It is, however, not necessary to create a port for every printer; many printers can be configured to the same port. With *port pooling*, however, one or more printers are connected to several ports.

ThinPrint Viewer

ThinPrint component for client-side print previews with Output Gateway. Consists of the components *TPView.dll* and *TPView.exe* with the following features:

	TPView.dll	**TPView.exe**
page preview	X	X
zoom	X	X
leaf	X	X
save in .tpf file format	X	
open .tpf file format		X
print	X	X
installation with ThinPrint Client	X	
can be downloaded (Page 126)		X

TPView.dll is also installed, together with ThinPrint Engine, on central print servers. In that case, it helps with V-Layer.

ThinPrint Virtual Channel Gateway

see *Gateways*

ThinShare

see the section *Print data compression* (Page 9)

29 Recommended: 600 ThinPrint Ports with 800 active printer queues (Windows Server 2003 with 3 GHz Dual Xeon processor, 2 GB RAM, and SCASII ultra3 disk array) or 1500 queues with Windows Server 2008 R2

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TLS	see *SSL*
V-Layer	Printing with ThinPrint Output Gateway; see the section *Driver Free Printing, V-Layer and Native Printing* (Page 8)
Virtual Channel Gateway	see *Gateways*
x64	Identifies all 64-bit processors from Advanced Micro Devices (AMD) as well as Intel processors with an AMD compatible 64-bit extension (e.g. Xeon and Pentium with EM64T). In contrast **ia64** identifies the 64-bit processor Itanium from HP and Intel.
XenApp	Server-based software (Citrix) for Microsoft Terminal Services

Abbreviations and acronyms

AD	Active Directory
AD-LDS	Active Directory Lightweight Directory
ALM	Annual License Model
ARR	Application Request Routing (Microsoft)
COM	Component Object Model
DLL	Dynamic Link Library
DMZ	Demilitarized Zone
DNS	Domain Name System
EMF	Enhanced Metafile (see glossary)
FR	Feature Release (ThinPrint)
GPO	Group Policy Object
GUI	Graphical User Interface
ICA/HDX	Independent Computing Architecture (the Citrix session protocol, see glossary)
ID	Identification (number)
IIS	Internet Information Services (Microsoft)
IPv4	Internet Protocol address space with 2^{32} addresses; example: 192.168.1.1
IPv6	Internet Protocol address space with 2^{128} addresses; example: 2001:0db8:85a3:08d3:1319:8a2e:0370:7344
LAN	Local Area Network
LPD	Line Printer Daemon (see glossary)
LPR	Line Printer Remote (see glossary)
LPT	Windows Line Printer Port
MMC	Microsoft Management Console
NAT	Network Address Translation
OU	Organizational Unit

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Output Gateway	ThinPrint Output Gateway
PCL	Printer Command Language
PCoIP	PC over IP (VMware's session protocol)
RAW	Standard Print Data Type
RDP/RemoteFX	Remote Desktop Protocol (Microsoft's session protocol, see glossary)
SQL	Structured Query Language
SSL	Secure Socket Layer (see glossary)
TCP/IP	Transport Control Protocol/Internet Protocol
TLS	Transport Layer Security
TP	ThinPrint
UI	User Interface
UPN	User Principle Name
URL	Uniform Resource Locator (web address)
VC	Virtual Channel (= RDP, ICA or PCoIP)
VCG (VC Gateway)	Virtual Channel Gateway (ThinPrint)
VCP	Virtual Channel Protocol (= RDP, ICA or PCoIP)
VDI	Virtual Desktop Infrastructure (e.g. VMware Horizon View, Microsoft Hyper-V, Citrix XenDesktop)
V-Layer	Printer Virtualization Layer (ThinPrint)
WinCE	Windows CE
WinNT	Windows NT 4, 2000, XP, Vista, 7, 8, 8.1, 2000, 2003, 2008, 2008 R2, 2012, 2012 R2
WMI	Windows Management Instrumentation (Microsoft)

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